

A blurred photograph of a crowd of people walking on a red carpet, likely at a high-profile event. The motion blur gives a sense of a busy, fast-paced environment. The people are dressed in formal or semi-formal attire. The red carpet is a vibrant red, and the background is out of focus, showing hints of other people and possibly event structures.

02/12/2021

Automation Anywhere Version A2019.19 On-Premises

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Explore

Welcome to the Explore pages for Automation Anywhere Enterprise A2019. This collection of topics is designed to introduce you to our latest RPA and Intelligent Automation platform.

Overview

Enterprise A2019 is the RPA industry's first purely web-based Intelligent Automation platform that is cloud-native. Delivered in the Cloud or On-Premises, Enterprise A2019 is designed for ease of use by all types of users across technical skill levels. The platform enables businesses of all sizes to achieve unprecedented scale with enterprise-class security, data privacy, and reduced time to value and costs of ownership. With Enterprise A2019, businesses can also leverage built-in artificial intelligence (AI) capabilities and easily integrate third-party AI solutions, such as computer vision, natural language processing, and predictive modeling—all with the simplicity of drag-and-drop AI into any automation workflow.

The Enterprise A2019 platform also includes attended automation and plug-ins that enable business users to automate tasks from within their business applications such as Microsoft Excel and Salesforce. This capability makes automation of front-office processes easier, faster, and more cost-efficient.

Enterprise A2019 is available globally and in 10 languages, including English, French, German, Japanese, Korean, Italian, Portuguese, Spanish, Simplified Chinese, and Traditional Chinese.

Available products

The Enterprise A2019 platform includes the following offerings:

- Enterprise A2019 delivered in the cloud, hosted by Automation Anywhere with no client installation or additional infrastructure required
- Enterprise A2019, the full platform delivered On-Premises
- Enterprise A2019 Free Trial, with 30 days to try the cloud-based offering with full tech support included during the trial period
- Community Edition, a free web-based option for users to experience a wide-range of Enterprise A2019 bot creation capabilities

More resources

- Training on Enterprise A2019: [Get trained and certified on Enterprise A2019 \(A-People login required\)](#)
- [Industry first bot security program](#)

Related concepts

[Enterprise A2019 Release Notes](#) on page 9

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

[About Automation Anywhere Enterprise A2019](#) on page 241

The Automation Anywhere Enterprise Digital Workforce platform is the foundation to deliver the automation of complex business work securely and at scale.

[Security architecture](#) on page 252

Many of the largest financial organizations in the world rely on Automation Anywhere's secure digital workforce platform to automate security-sensitive operations.

Related information

[Automation Anywhere Enterprise RPA Platform](#)

[What is RPA?](#)

[Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#)

Enterprise A2019 Release Notes

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

Follow the links to view the release note updates for the respective release.

Related concepts

[Community Edition A2019 Release Notes](#) on page 193

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations in different Community Edition A2019 releases.

Related reference

[Enterprise A2019 feature comparison matrix](#) on page 224

Use the feature comparison matrix to compare the Enterprise A2019 features with the features in Automation Anywhere Enterprise 11.3.x and 10.x versions.

[Enterprise A2019 FAQ](#) on page 239

For details and questions on the latest Automation Anywhere platform, Enterprise A2019, review this FAQ.

Enterprise A2019.19 Release Notes

Release date: 11 February 2021

Review the new features, changed features, fixed features, security fixes, deprecated features, and known limitations in the Enterprise A2019.19 (Build 8098) release.

- [Migration features](#) on page 9
- [Enterprise A2019](#) on page 11
- [AARI](#)
- [Discovery Bot](#) on page 21
- [IQ Bot](#) on page 22
- [Bot Insight](#) on page 25

Migration features

11.x and 10.x features

Review messages in Migration Assistant

The Migration Assistant displays review messages for migrated bots. Open the migration assistant for a bot to review messages for that bot.

[View changes to migrated bots using Migration Assistant](#) on page 509

11.x and 10.x features
Migrate MetaBots with screens Migrate MetaBots that contain screens as assets. You can migrate screens based on UI Automation technology and captured using the Object play mode. How MetaBots are migrated on page 498
Review messages in Bot Scanner report The Bot Scanner report shows review messages about the behavior change in commands that are used in bots that can be migrated to Enterprise A2019. Analyze reports on page 449
Stop, or pause and resume migration You can stop, or pause and then resume the migration process from the bot launcher and the Activity > In progress page. Stop bot migration on page 506 Pause and resume bot migration on page 505
Migrate bots that use capture scrollable text action in App Integration command 11.x and 10.x App Integration commands that capture text from an application window with a vertical scroll bar are migrated to the App integration > Capture scrollable text action in A2019. Package mapping for migration on page 453
11.x only features
Map output of PDF integration command to multiple variables The output of a 11.x bot that uses the PDF integration command is mapped with multiple variables in the equivalent actions of the PDF package after the bot is migrated to Enterprise A2019.
Migrate bots that use the following attributes: • Bots that send Japanese text in the VT100 terminal using the Send Text command • Bots that use the Get Single Node or the Get Multiple Nodes command to extract nodes that contain namespaces from an XML file • Bots that contain the Connect command of the Terminal Emulator command and the value in the Wait Time Out field that is less than hundred milliseconds
Migrate bots that use the following options in the Active Directory command: • The Modify Object command with the Rename, Delete, Move, and Set Property actions for the Computer and Organizational Unit object type. • The Modify Group command with the Add users to a group and Remove users from a group actions. Package mapping for migration on page 453

10.x only features

Migrate latest version of 10.x bots enabled with version control

You can now migrate the latest version of bots from your 10.x Enterprise Control Room configured with SVN version control to A2019. Use the Copy 10.x data option to copy the latest version of the 10.x bots to A2019 and then use the Bot Migration Wizard to migrate the bots to A2019.

[Copy 10.x data](#) on page 442 | [How 10.x data is copied to Enterprise A2019](#) on page 444

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features

Auto-login settings

Use the auto-login configuration in the Enterprise Control Room to reduce bot startup time by reusing an existing user session. Configure auto-login in the Administrator settings for all devices or customize it from the Devices page for each device.

- Configure the auto-login settings for a user session to create a new session or reuse an existing session
- Keep user sessions unlocked
- Log off from a user session after the bot completes execution

[Configure auto-login settings](#) on page 1134 | [Devices](#) on page 1067

New CPU utilization and device memory settings

Configure the CPU utilization and device memory threshold value in the Enterprise Control Room settings to determine whether to deploy bots on devices or not.

[Configure threshold settings for user devices](#) on page 1134

Install Bot agent on devices without administrator privileges

You can now choose to install the Bot agent on user devices with either local user privileges (without administrator privileges) at the local user level or administrator privileges at the system level.

[Install Bot agent and register device](#) on page 400 | [Create device pools](#) on page 1074 | [User management](#) on page 1104

When you install the Bot agent at the user level, the device will not be available as a default device for another user or for device pool selection during bot deployment. For more information, see [Bot agent known limitations](#).

New features
New diagnostic utility for Bot agent Use the Bot agent diagnostic utility to perform diagnostic checks on Bot Runner devices and to resolve Bot agent connectivity issues. Perform Bot agent diagnostic checks on page 416
New features in Data Table package (Service Cloud case ID: 00656843, 00707635) • Use the Change column type action in the Data Table package to perform operations on the column of a data table. Use this action to change the column data type to Boolean, Datetime, Number, or String. • Sort the data in the data table in Number, Datetime, Boolean, or String format. Data Table package on page 549
New action in App Integration package Use the Capture scrollable text action to extract text from the selected window or any control within the selected window and save it to a variable. If you click any control within the window, then text from that specific control is extracted. If you click outside the window, then all the text from that window is extracted. App Integration package on page 533
New encoding combo box option in Terminal Emulator for VT Series To send and receive Japanese text, you can now use the Encoding and CodePage combo boxes when you connect to the Terminal Emulator for the VT series terminal type. Using the Connect action on page 811
New actions in Active Directory package Use the following actions in the Active Directory to automate a task: • Move a computer Using the Move computer action on page 524 • Move an organizational unit Using the Move organizational unit action on page 528 • Add users to a group Using the Add users to group action on page 531 • Remove users from a group Using the Remove users from group action on page 531
New system variable for new line character (Service Cloud case ID: 00669232, 00672775, 00673578) Use the \$String:Newline\$ system variable to add a new line character. This variable adds a new line character in various applications regardless of the operating system of the device.
Zero-size form for Enterprise A2019 (Service Cloud case ID: 00677611) The Run action uses the zero-size form with name <code>AAZeroSizeForm</code> that can be used by DLLs to identify zero-size forms created by Enterprise A2019.

New features
Enhancement to define parent path in Active Directory When you establish a connection with an LDAP server, you can now select the LDAP path by connecting to the server. Using the Connect action on page 527
Obtain information about Run-As user after bot deployment Use the AATaskExecutor system variable to return the username, first name, last name, and email of the user that ran the bot. If the bot is deployed on an attended Bot Runner, this variable returns information about the logged-in user. If the bot is deployed by a trigger, this variable returns information about the user associated with that Bot Runner license. System settings and parameters on page 868
Enhancements to the Recorder - Universal Recorder now supports object capture in Mozilla Firefox. You must install the A2019 extension from Mozilla Firefox browser add-ons. - Capture table, grid view, and main window objects from SAP applications. Universal Recorder supported applications and browsers on page 841 Actions performed on objects captured with Universal Recorder on page 750
Multi-user device supported on Citrix Windows 10 Enterprise (Service Cloud case ID: 00526001) Multi-user device sessions are now supported on Windows 10 Enterprise on Citrix, enabling multiple users to access the same device at the same time.
Auto Login support on Citrix VDI (Service Cloud case ID: 00680200) Auto Login is now supported on Citrix VDI, which enables bot deployment in unattended mode. Configure auto-login settings on page 1134.
Restore bots from Git repository If your database is deleted or corrupted, the admin user can restore all your bots and the associated dependent files from the Git repository to your new empty database. Restore bots from Git repository on page 1141

Changed features
Enhanced security for multi-user Bot agent devices (Service Cloud case ID: 00695858) The Bot agent configured on multi-user devices for RDP-based deployments now uses the updated version of <code>wfreerdp.exe</code> for enhanced security.
Deployment API enhancement (Service Cloud case ID: 00655548) When you invoke a regular deployment API, if a RunAsUser is being used to deploy a bot, the deployment API will not deploy other bots until the RunAsUser is free to run the other bots.
Status change initiates workload automation deployment When you change the status of a Work Item from Failed to New in the Enterprise Control Room (Queues), the deployment of a workload automation in queue is initiated.

Changed features
Install Google Chrome extension offline with Bot agent (Service Cloud case ID: 00623511, 00689623, 00715413) You can now install the Google Chrome extension offline from the Bot agent setup and MSI files.
ANSI as default encoding in Data Table package For text write operations, Data Table package > Write to file action supports ANSI as default encoding type. Bots created in the previous version of Enterprise A2019 with UTF-8 is not impacted by this change.
Enhancement to PDF package In the PDF package, when you enter an incorrect page range in the Page range field and execute the bot, an error message is now displayed, requesting you to provide the correct page range. The message is displayed for the following actions: • Merge document • Split document • Extract text • Extract image
Bots wait for Google Chrome web page to load When automating a task in the Google Chrome browser, bots now wait up to 30 seconds for the web page to load, and then run the subsequent Recorder > Capture action. When the page loads, bots search for the object for the duration specified in the Wait for control field. Waiting for the web page to fully render increases the bot's ability to identify the target object in the web page.
Enhancement to desktop operations When you create a bot and select an option for desktop operations, the data selected from the drop- down list now persists even when you navigate to other fields.

Fixed features	
Service Cloud case ID	Description
--	The Bot Scanner now displays the correct message for the MetaBot logic that contains credential variables that cannot be migrated to Enterprise A2019.
00687223	A 11.x bot that passes a blank value as an input to the string, list, one-dimensional array, and two-dimensional array of string type variable used in a DLL no longer encounters an error when you run that bot in Enterprise A2019 after migration.
00677231	A bot is no longer unresponsive if it contains an action to close the Google Chrome browser followed by an action to open the Google Chrome browser.

Fixed features	
Service Cloud case ID	Description
00687207	When a 11.x bot contains objects captured using the Object Cloning command and that object has a property that contains an expression within the \$ character, the 11.x bot no longer encounters an error after migration to Enterprise A2019.
00689286	The Bot Scanner no longer encounters an error when you scan a 11.x bot that contains the If command with the Windows control condition selected and is automating a task on a Microsoft Excel file.
00706438	An error is no longer encountered when you are installing Enterprise A2019 and: - You are migrating from 11.x to Enterprise A2019 - Active Directory is configured on the 11.x Enterprise Control Room - The restored 11.x database contains the AAE_Meta Bot Designer role
00626664	You can now migrate bots that automate tasks in BMC applications. The migrated bots use the Legacy automation > Manage web controls action to automate interactions with objects.
--	You can now select the regular expression Case insensitive option in actions that contain a window title field and successfully perform a recapture in the application window.
00688134	In the Database package, Korean characters are now displayed properly when you use the Insert/Update/Delete action in an Excel file. Previously, the Korean characters were not displayed properly when the action was used.
00675749	In the Email package, you can now forward an email using groupId or Alias. Previously, the mails were not sent by the SMTP server if the email address contained groupId or Alias in the To address field.
--	You can now use a double backslash (\\) in the Send text action of the Terminal Emulator and execute bots. Previously, when a double backslash (\\) was used in this action and the bot was executed, the terminal displayed a single slash (\).

Fixed features	
Service Cloud case ID	Description
00688692	When you connect to the EWS server to read mails using Loop, the retrieved email now displays the content correctly per the selected mode (HTML or plain text formats). Previously, when connecting to the EWS server to read an email in HTML format, the email body displayed a blank output.
00659456	In the Loop package, when you select For each file in folder as the Iterator option, the Note below the Assign file name and extension to this variable field now displays the key name in English. Previously, the key name in the Note was translated to the languages you selected.
--	A bot no longer runs intermittently when the focus changes from one window to another window and does not display the Type_015 Google Chrome plug-in error.
00683528	In the Database package, single entries are now inserted in the database when you execute a store procedure to add rows in the table and the option Export data to CSV is selected. Previously, duplicate entries were added in the database.
00693664	Fixed an issue where Japanese characters did not display correctly when input into a field that contained a variable.
00677167	The locker Participants tab now shows only the assigned participants for that specific locker. Previously, the tab displayed the participants of the previously viewed locker, requiring the user to refresh the browser to see the correct participants.
--	The Enterprise Control Room services can now be run using the non-administrator service account users. The Bad Gateway error message is no longer displayed.
00691232	Fixed an issue that did not allow users to update the value of a file type input variable after saving the bot.
--	The Save option is now correctly enabled when users make any changes to the metadata, unique entity, or SAML assertion mode.
--	The username is no longer saved in the login window after the user logs out unless the user has selected the Remember my username option.

Fixed features	
Service Cloud case ID	Description
00682021	When you check in a bot that has cloned bots as dependencies, the dependent files are no longer lost from the private workspace. Also, after the check-in, if you create a new bot using the same dependencies as in the earlier bot, the new bot executes successfully.
--	Work Items are now processed for workload automation after you add more Work Items to an existing queue.
--	Work Items are now reprocessed for workload automation after you change the status from failed to new.
00711410	You can now migrate workload automations in an Enterprise Control Room configured to use a manual mode for Credential Vault.
00667047, 00673289	Auto-login for a user session no longer fails for bots deployed on virtual machines when the VDI session is disconnected or is in a locked state, and the following token error message is no longer displayed: An attempt was made to reference a token that does not exist.
00560593, 00585092	Universal Recorder is now aligned with the Bot agent, so the recorder can capture objects on devices with any proxy server configuration.
00675695	When you use the Excel advanced package, the bot now opens an Excel file without any issues. Previously, the bots failed to open an Excel file in some scenarios due to internal hardware components.
00678567	CSV formulaic entries are no longer permitted in data fields of web applications, such as device names. These fields are limited to accept alphabetic characters, numbers, hyphen, and underscore entries only.
00691551	Turkish characters are now supported in user names.

Known limitations
Bot agent installation Starting from this release, when you install the Bot agent at the local user level, keep the following in mind: - You cannot install the Bot agent at the user level if you log in to the device as the root administrator. - Auto-login is not supported for local users and unattended Bot Runners. - The auto-update feature for the Bot agent will be applicable from the subsequent release because the option to install the Bot agent at the local user level is introduced in this release. - You cannot configure multi-user devices. - Enterprise A2019 recorders for third-party applications: - No separate setup is required for JRE 6 and 7. - Citrix XenApp is not supported because administrator privileges are required to set up Citrix. - You must upgrade to the Enterprise A2019.19 Recorder package to use Discovery Bot. - You must have write permission to AISense Recorder logs.
Bots encounter a Java heap space error when they use the Excel basic package to open an Excel file that is 20 MB or larger. Workaround: Increase the Java virtual machine heap space to 8 GB: - Navigate to <code>C:\Program Files\Automation Anywhere\Bot Agent\config</code>. - If it does not already exist, create a new text file named <code>nodemanager.properties</code>. - Open the file and copy the following text and paste it in the file: <code>bot.launcher.jvm.options=-Xmx8092m</code> - Open Windows Services and restart the Bot agent.
Bots wait a maximum of 30 seconds for an object to appear in the Google Chrome browser, regardless of the value in the Wait for control field in the Recorder > Capture action.

Automation Anywhere Robotic Interface (AARI)

New features
New filter task in the process editor In the process editor, the Filter Task enables users to filter variables such as human or bot task output with a specific filter criterion. Create an AARI process on page 912
New process task in the process editor Use the new Process Task option in the process editor to call a subprocess within the main process. This feature enables you to separate tasks into different processes instead of including all the tasks in a single process. Multiple teams can now work at the same time on different tasks within the main process and remain segregated, without any conflicts. Create an AARI process on page 912

New features
Hide a task or view a hidden task With a Bot Creator license, you can now perform the following: - Hide the display of human and bot tasks by selecting the Hide this task after completion option in the process editor. - View a hidden human or bot tasks by selecting the View hidden tasks option in the tasks view page. Create an AARI process on page 912
Edit title in process editor Users can now edit the title in the process editor.
Rich-text editor updates (web interface) In the web interface, you can use rich-text editor features such as bold text, italics, underline, alignment, formatting, color, and size in tasks.
Table element updates (web interface) In the web interface, the Table element now supports the use of date, number, drop-down, and text values in tasks.
Updates to elements in form builder The form builder now includes the following new elements: - Select Folder element: Add an upload folder option in the form. Using the Select Folder element on page 936 - Hyperlink element: Assign a URL in the form. Using the Hyperlink element on page 937
Enhancement to the Button element You can now use the Disallow button click when this form is first loaded option to disable the Button element in a form when it is displayed for the first time during bot runtime.
Enhancement to the Checkbox action trigger If a form with a Checkbox element is used within a trigger loop package, you can now use the Value selected and Value unselected trigger actions. Trigger loop package on page 819
Changed features
Create and view requests (AARI manager) An AARI manager can create and view requests from processes that are assigned to the team they belong to or own. They can also create and view requests from processes that are assigned to themselves but not to the team.

Changed features
Cannot assign the same device to Bot Creator and unattended Bot Runner for triggers After you update to this Enterprise A2019 release from an earlier version, a default device that is assigned to a Bot Creator or an attended Bot Runner cannot be assigned to an unattended Bot Runner for deploying triggers. Recommended: Use separate devices or device credentials (auto-login) for a Bot Creator and an attended Bot Runner as deployments can overlap or override across licenses.

Fixed features	
Service Cloud case ID	Description
00707684, 00707688, 00707192, 00706781, 00707900, 00709109	All event triggers are now retained when you update to this Enterprise A2019 release from an earlier version.
--	In the process editor, undo and redo functions are now available for both canvas and properties panel interactions by default. Previously, the undo and redo functions were only available for canvas interactions.
--	Previously during bot runtime, if you deleted all the existing rows from a table before adding a new row, the columns and rows of the table were misaligned. You can now drag and resize any column to reset the table alignment.
--	All the trigger events within a form are now retained and no longer fail when the form is closed and reopened during bot runtime.
--	In the process editor, if you replace the Go to option with an End process, the End process icon now displays the correct status (Completed, Failed, Canceled). Previously, the status was not displayed correctly and had to be changed manually by using the End process option.
--	When you delete a request from the Request tab and it is sent to the recycle bin, the related task from the Task tab is now removed.
--	When you filter your tasks in the Task tab, the results shown in the tab now retain the information when you navigate between different tabs.

Deprecated features

Support removed for device pool configuration

An AARI administrator can no longer use the device pool configuration to deploy bots in a process. After upgrading to Enterprise A2019.19 from an earlier version, verify that the scheduler user configuration is set up in order to successfully execute your bots in the process.

[Configure scheduler user for AARI on the web](#) on page 929

Known limitations

If the Set action is used immediately after a Get action, the value assigned to a variable using the Get action is not retrieved in the specified form element of the Set action during bot runtime.

An AARI manager can create a request from a process that is assigned to them but not to their team. They can create and complete the request if the process contains only bot tasks. If the process contains a human task, the manager cannot assign the human task to themselves.

Workaround: Assign the process to both the manager and their team.

Discovery Bot

New features

View the duration of each recorded step

A recorded step is now displayed in minutes and seconds for the business user and analyst. Use this information to understand which steps are a bottleneck in the current process and will provide most benefit from automation. The step duration is displayed from the Recordings page (below the screenshot image), and from the View process and View opportunities page from the Preview pane window.

[Record a Discovery Bot business process](#) on page 968

Recorder enhancements

You can now perform actions such as double-click, drag-drop, click and hold, and text select when recording a business process.

[Record a Discovery Bot business process](#) on page 968

Changed features

Enhancement to the screenshot

The screenshot image of the recorded step is now increased to full size for a more clear, detailed view of the recorded step.

Fixed features	
Service Cloud case ID	Description
--	You can now click the Screen icon to display an image that you have hidden and saved. Previously, you had to click Screen and then click Save to display the image again.
--	When an opportunity is created for a system-generated view with filters applied, the filter now persists across the view displayed in the Aggregated tab from the Opportunities page. The filter is not reapplied on the view from the Opportunities page and the No recording data message is no longer displayed.
--	When you now cancel a recording, the recording is not displayed on the process tile in Process Cycle.
--	You can now approve a recording with 2000 steps. The Recording status is displayed as approved.

Known limitations
Double-click, drag-drop, and click and hold are not captured and displayed by the recorder on the Recordings page. To include these actions performed during the recording, you can document the individual steps in the Step description field for the analyst. Text selection using right-click or Ctrl+C and paste is captured and displayed by the recorder on the Recordings page.

IQ Bot

New features
Support for variables in IQ Bot actions (Service Cloud case ID: 00511178) IQ Bot On-Premises and Cloud You can now use variables in the Download all documents and Upload Document actions in the IQ Bot package. Create a variable on page 873 IQ Bot package on page 678

Changed features
Rename a learning instance (Service Cloud case ID: 00675803) You can now rename a learning instance in staging in IQ Bot.

Changed features
Sequential document processing (Service Cloud case ID: 00662968, 00665331) When you click See Extraction Results, IQ Bot now opens that request in a new browser tab where its number in the queue is displayed. This number keeps decreasing as the previous requests in queue are processed.
Dutch language support IQ Bot now supports the Dutch language with ABBYY FineReader Engine.
Configure OCR settings using REST APIs A user with AA IQ Bot Administrator role can now use the <code>appConfigurations</code> API to read and update the OCR settings. Select an OCR engine

Fixed features	
Service Cloud case ID	Description
00639117	Numeric format in the Polish language is now accepted in the IQ Bot Validator.
--	When you upload a document immediately after deleting a bot it was associated with, extraction results are now displayed irrespective of when the bot was deleted. Previously, an interval of 3 minutes was required to view the extraction results of the deleted bot.
00636899, 00683451	When you create a learning instance using the custom domain, the field names now appear correctly, irrespective of the custom domain language.
00459301, 00677204, 00532325, 00658245	Custom Python logic now displays extraction results in the Designer without any errors.
00657928, 00679540	Exported IQ Bot archive (.iqba) files no longer contain any unclassified records in the .csv files.
00704365	If documents uploaded during production have fewer pages than the staging documents that the bot was trained with, these production documents are now processed without any errors.
00703560, 0062442	When you migrate learning instances using the append option, all records are now correctly migrated, irrespective of the number of records in the IQBA file.
00715124	IQ Bot now deletes temporary files downloaded from Amazon S3 server in the <code>C:\windows\temp\</code> folder when they are no longer required. As a result, storage is no longer consumed by these temporary files.

Fixed features	
Service Cloud case ID	Description
00686297	IQ Bot machine learning services are now correctly installed when you install IQ Bot.

Known limitations	
IQ Bot On-Premises and Cloud	If you click See Extraction results multiple times, the Learning instances listing page is opened instead of the extraction results.
IQ Bot On-Premises and Cloud	When creating a table on the Designer page, if you click See Extraction results without completing the table creation, extraction results are not displayed. Workaround: Create the table first and then click See Extraction results.
IQ Bot On-Premises and Cloud	An error message is displayed when you refresh the extraction results page for a learning instance when the associated bot is moved to production.
IQ Bot On-Premises and Cloud	When a bot is deleted, an incorrect error message is displayed when you click the Test bot option on the Bots listing page.
IQ Bot On-Premises and Cloud	If you rename a learning instance in production and download the files, all the files associated with the original learning instance are also downloaded. For example, if you rename a learning instance from Sales1 to Sales2, all the files associated with Sales1 are also downloaded when you download Sales2.
IQ Bot On-Premises and Cloud	If you have multiple learning instances and you click See Extraction results for all of them, the extraction results are not processed in the order of their request.
IQ Bot On-Premises and Cloud	When you create a learning instance with check box fields and run a Python script associated with the check box, an error message is displayed on the Designer page.
IQ Bot On-Premises and Cloud	When you upload staging or production documents to a learning instance, temporary files are created in the C:\Windows\Temp folder, and the folder size might increase over a period of time. Therefore, manually delete the files from this folder because it can cause IQ Bot A2019 to stop responding.

Known limitations

IQ Bot On-Premises and Cloud

If you select the Only for me option when installing the Bot agent, the IQ Bot Extraction action has the following issues:

- Takes a very long time to process a document.
- Some of the documents might not be processed successfully.

Workaround: During Bot agent installation, choose the Anyone who uses this computer (all users) option.

Bot Insight

Fixed features

Service Cloud case ID

Description

00669196

When you apply date filters on a dashboard and then apply an attribute filter in the widget, the system now filters by a specific date. Previously, the date filter applied at the dashboard level was ignored when the attribute filter was selected at the widget level. As a result, historical data was also displayed.



Important: The supported packages information is moved to this topic: [Viewing package versions available in the Enterprise Control Room](#) on page 861.

Enterprise A2019.18 Release Notes

Release date: 11 January 2021

Review the new features, changed features, fixed features, known limitations, and supported packages in the Enterprise A2019.18 (Build 7560) release. For IQ Bot, Build 7553 is available for Cloud customers and Build 7554 is available for On-Premises customers. There are no security fixes in this release.



Important: We have updated Enterprise A2019.16 to Build 7560 to include fixes for issues with WLM (Service Cloud case IDs 00696614 and 00703339) and SSO authentication on Enterprise A2019 Cloud (Service Cloud case IDs 00706042, 00706074, 00706201, 00706195, 00706134, 00706022, and 00707033). See the [Fixed features](#) section for more information.

- [Migration features](#) on page 26
- [Enterprise A2019](#) on page 27
- [AARI](#)
- [Discovery Bot](#) on page 38
- [IQ Bot](#) on page 40
- [Bot Insight](#) on page 42
- [Supported packages](#) on page 42

Migration features

11.x and 10.x features
Migrate MetaBots with screens Migrate MetaBots that contain screens as assets. You can migrate screens based on HTML, MSAA, and .NET technologies and captured using the Object, Image, and Coordinate play modes.
Configure timeout in Bot Migration package When migrating bots, you can now set a timeout value in the range of 3 through 90 minutes (default value is 90 minutes). If the migration of any specific bot is not completed within the set time, a timeout message is displayed and the migration process moves to the next bot.
Use regular expressions in variables (Service Cloud case ID: 00628227) Use regular expressions (regex) in value type variables to specify the entity on which you want to perform an operation. For example, actions in the File, Folder, String, and Window packages allow use of regular expression in variables. When 11.x or 10.x bots with commands that use regular expressions in variables are migrated, if their equivalent actions in Enterprise A2019 do not support regular expressions, the regular expression is converted to string in the migrated bots.
Migrate MetaBot that returns a list variable You can now migrate MetaBots that contain logic that return a list variable to the parent bot.
Migrate bots that use functional keys Migrate bots that use functional keys such as F1, F2, and F3 in the Send Text command.
Migrate bots that extract information from PDF Migrate bots that use the Extract Form Fields command to extract data from the fields in a PDF file.
11.x only features
Migrate to Enterprise A2019 on Linux CentOS (Service Cloud case ID: 00654757) You can now migrate from 11.x to Enterprise A2019 installed on Linux CentOS. Migrate from 11.x to Enterprise A2019 on Linux CentOS on page 440
Migrate imported 11.x bots to Enterprise A2019 You can now migrate 11.x bots that you imported using the BLM feature or the Import API to Enterprise A2019 by using the migration wizard.

11.x only features

Migrate bots that use the following attributes:

- Bots that use regular expression (regex) to search for the string and title of an application window on which you want to perform an operation
- (Service Cloud case ID: 00616115) Bots for which custom format is configured for system dates
The system uses the AADefaultDateFormat global value to store the format of the date.
- Bots that use the Search Field command to search a field index or field name by using text in the Terminal Emulator

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features

Create a Citizen Developer user

Administrators can now use the Citizen Developer license to create Citizen Developer roles and users in the Enterprise Control Room. Users with this license can create and run bots (including bots with triggers) on their devices.

[Enterprise A2019 licenses](#) on page 392 | [Create a Citizen Developer role](#) on page 1121 | [Create a Citizen Developer user](#) on page 1108

Recorder enhancements

- Use the AISense Recorder Define option to record an interaction, such as click active text, with an object that is only visible when you hover the mouse over the object.
- If you record a click and keystrokes in a text box with a Control Type of `PASSWORD_TEXT`, the Recorder does not capture the keystrokes entered into the field. Instead, the action selects the Set text option and offers users the option to select a credential from the Credential Vault, enter a credential variable, or enter an insecure string.

Export and import Bot Insight dashboards using BLM

The Bot Lifecycle Management (BLM) feature now enables you to export and import Bot Insight dashboards (default, custom, and published) associated with analytics bots from one Enterprise A2019 instance to another. You can also export and import Bot Insight dashboards using the BLM export and import APIs.

[Export bots](#) on page 1162 | [Import bots](#) on page 1163

New features
Support for non-persistent VDI Non-persistent virtual desktop infrastructure (VDI) is now supported for temporary devices so that you can configure settings for temporary devices in the Enterprise Control Room or during Bot agent installation. The feature includes the following capabilities: • Automatically register a device. • Automatically mark a device as default for the logged-in user. • Automatically add a device to an existing pool. • Delete offline devices from a list of devices. • Add parameters for temporary devices in the Bot agent MSI file. Configure default device settings on page 1132 Configure auto-delete temporary device settings on page 1133 Perform silent installation of Bot agent on temporary devices on page 410
Efficiently map input and output variables between parent and child bots (Service Cloud case ID: 00537090, 00698697) For input variables, use the Quick map option to select the variables and set the values for the parent bot to pass. For output variables, use the Multiple variables tab to associate each dictionary key with a variable. This feature eliminates the need to use actions to extract the output dictionary values. Task Bot package on page 804 Using the Run action on page 805
Support for PowerBuilder application in App Integration package (Service Cloud case ID: 00680703) The App Integration package now supports PowerBuilder to capture and extract text from a window application. The Capture text of window action enables you to open a PowerBuilder screen to capture all the data and verify the captured text.
Enhancements to check-out option in the private workspace • The My bots page in the private workspace displays a new status Checked out edited for bots that are checked out and edited. • Use the Revert edits option to cancel any changes you made to the checked-out bot in the private workspace.
Programmatically delete bots, files, and folders Use the <code>Delete files/folders</code> API to delete objects from the private or public workspace. Delete file/folder API on page 1252
Manage scheduled bots using APIs Use the <code>Bot Scheduler</code> APIs to create, update, and view details, and delete bot schedules. Bots can be scheduled to run at a specific date and time on an unattended Bot Runner, or on a recurring basis. Bot Scheduler APIs on page 1178

New features
New action in Terminal Emulator package Use the Search Field action in the Terminal Emulator package to search for a field based on the text it contains. This action returns the name or index of the field based on the option selected. Terminal Emulator package on page 808
New action in PDF package Use the Get Property action in the PDF package to retrieve the properties of a PDF file and assigns the properties to a dictionary variable. Using the Get property action on page 738
New actions in Browser package Use the following actions in the Browser package: • Close: Closes a Google Chrome browser window or tab. • Get source code: Retrieves the source code of a web page and saves it to a string variable. • Go back: Returns to a web page that you previously visited in the current tab. • Open: Opens the browser to a specific web page in an existing tab, new tab, or window. • Run JavaScript: Executes JavaScript in a web page. Browser package on page 540
Specify application window dimensions Use the Resize windows option to set the window height and width to specific dimensions or to the dimensions at which it was captured. This feature enhances the bot's ability to identify the target object. The following packages support this feature: • App Integration • If Image recognition condition • If Legacy Automation > Window Control condition • Image Recognition • Simulate keystrokes • Legacy Automation Desktop > Manage windows controls action • Loop While > Image recognition condition • Loop While > Legacy Automation > Window Control condition • Mouse • OCR • Screen
Support for function keys in Terminal Emulator package Function keys (F1 through F24) are now supported to automate processes using ANSI and VT100 terminals in the Terminal Emulator package.

New features

Use regex case insensitive flag for Window title

Enable the regex Case insensitive flag to identify a Window title field as not case-sensitive. This feature enables you to successfully run the bots even if the letter case does not match the captured window title.

The following packages and actions support this feature:

- Wait
- Image Recognition
- Simulate keystrokes
- Mouse > Click action
- Legacy Automation Desktop > Manage windows controls
- OCR > Capture window, Capture area
- Screen > Capture window, Capture area
- Recorder > Capture
- Window: Activate, Close, Maximize, Minimize, Resize

Unattended Bot Runner supported on Citrix devices

You can now deploy bots on unattended Bot Runners on virtual machines on Citrix XenDesktop and Citrix VDI Windows 2016.

Changed features

Only Bot Scanner related files and folders are deleted

The Bot Scanner now deletes only Bot Scanner related files and folders from the destination folder.

[Scan bots using Bot Scanner](#) on page 448

Enhanced transport layer security (Service Cloud case ID: 00677546, 00681830)

The default Elasticsearch ports (47599, 47600) now use the more secure TLS version 1.2 and later as the communication channel between the Enterprise Control Room and Elasticsearch server.

Enhanced Update node action in XML package (Service Cloud case ID: 00663089)

When you edit and save an XML node, the bot updates the required attributes and their values in an alphabetical order, without removing any existing attributes of the node.

For example, consider two existing attributes in an XML node such as Name=~~Peter~~ and Phone=9829xxxxxx. If you change the value of the phone attribute as 9887xxxxxx and add a new attribute Gender with value as Male, the bot updates the phone value and adds the gender as a new attribute, without removing the existing name attribute.

Interface change in Excel basic and Excel advanced packages

The session name field is now the last field in actions in the Excel basic and Excel advanced packages.

Changed features
Access at subfolder level in Enterprise Control Room repository (Service Cloud case ID: 00634847, 00681221, 00685654) An administrator can now allow access at the subfolder level in the Enterprise Control Room by assigning the Run, Check-in and Check-out permissions to the subfolder. You can only access the contents of the subfolder and not the other bots or files in the parent folder.
Increased working area in the Bot editor More horizontal and vertical screen area is available in the Bot editor for developing bots. You can hide or display the Actions and Details panels to maximize the working area in the Bot editor.

The following table lists the fixed features and the builds in which they were fixed (Build 7560 is the latest build, and Build 7554 is the previous build). The fixes are cumulatively available in the latest build.

Fixed features		
Build number	Service Cloud case ID	Description
7560	00696614	Bot deployment is no longer delayed after you insert Work Items if idle devices are available for the deployment in queues.
7560	00703339	The post Work Item insertion flow is now improved so that bot deployments are not delayed.
7560	00706042, 00706074, 00706201, 00706195, 00706134, 00706022, 00707033	An issue with Control Room login page not supporting SAML for SSO and reporting an errant IPD response has been addressed. The SSO function of the Control Room login works as expected.
7554	00659336	11.x bots that use the Image Recognition command or Image Recognition condition of the If command now run successfully after migration to Enterprise A2019.
7554	00647634	The Bot Scanner no longer becomes unresponsive when scanning a large repository.
7554	00678614	An error is no longer encountered when you migrate a bot with a credential name that contains a space character or a special character.
7554	00669247	An error is no longer encountered when you download a file from a URL that contains a Unicode character using the Download files action of the Browser package.
7554	00685916	If you have used the Date system variable as an input variable in a MetaBot, the Date system variable is now available after migration to Enterprise A2019.

Fixed features		
Build number	Service Cloud case ID	Description
7554	00674594	The Bot Scanner no longer encounters an error when scanning a bot that uses the Excel Column system variable after the Loop command and the column name specified in that variable contains a space character.
7554	00691905	An error is no longer encountered when you edit a user after migrating to Enterprise A2019 from Version 11.3.3.
7554	00691072	An error is no longer encountered because of the bypass configuration of proxy settings when you use the Enterprise A2019 Bot Migration Wizard.
7554	00689910	You can now import more than 2100 bot files without any SQL exception error.
7554	00669927	When you execute the Bot Insight Business Data and Operations Data APIs, only information limited to the logged-in tenant is now retrieved in the API response.
7554	00639779	After you log in to the Enterprise Control Room and connect manually to a VPN, the Bot agent now reconnects automatically. You do not have to restart the Bot agent service to reconnect.
7554	00622075	When you run a bot on a user device that has an extended display, the runtime window is now completely visible on the main display. Previously, the window was partially visible between the main and extended display.
7554	00678454	In Excel advanced, you can now use the Set cell action to write more than 4100 characters in the excel file. Previously, the bot execution failed when the cell value had more than 4100 characters.
7554	00675333	In the Number package, the field in the Assign action is now corrected as Select the source number variable/ value. Previously, the Select the source string variable/ value field was incorrect.
7554	00674315, 00677925, 00684201	When you create a TaskBot using the If and Else if actions and change the placement of the Else if block action, there is improved visibility in the Flow view. Previously, the TaskBot was not displayed properly on a low contrast display when the Else if block placement was changed.

Fixed features		
Build number	Service Cloud case ID	Description
7554	00662072, 00674336	In the Terminal Emulator package, you can now correctly page up using the KEY_PGUP function key and page down using KEY_PGDOWN for the TN5250 terminal type.
7554	00658261	The PDF Extract image action now supports CMYK (cyan, magenta, yellow, black) images format when you extract and save a CMYK image to an RGB (red, green, and blue) image. Previously, if PDF files contained CMYK images, the bot could not extract them and displayed an error.
7554	00675749	When you receive emails using the EWS server option, the emailCc and emailTo variables now return the proper value. Previously, these variables returned blank values.
7554	00663610	In the Ftp/Sftp package, you can now connect to ftp.box.com and use the Get folder action. Previously, the Get folder action downloaded files in the folder, causing the bot to run in an infinite loop.
7554	00675710	In the Data Table package, the Remove duplicate rows action now removes all duplicate rows rather than a single duplicate row.
7554	00539762	In the For value action of the Prompt package, characters are no longer visible during keystrokes of masked values.
7554	00679370, 00673085, 00674546, 00676912, 00678852, 00678796, 00692420, 00695390	An unknown error is no longer encountered when you run the Open Excel file action from a network drive.
7554	00672719, 00673048	Audit log entries in the Enterprise Control Room are now retained even if the Elasticsearch data is configured to a file path other than C:\ (C drive) during installation.
7554	--	You can now insert Work Items from one queue to another queue for workload automation.
7554	--	You no longer have to pause and resume queues because Work Items are now processed and not randomly skipped when you use the priority queuing or round-robin method for workload automation.
7554	--	The Recorder package no longer takes time to upload to a remote application repository path of an On-Premises Enterprise Control Room deployed on Microsoft Azure.

Fixed features		
Build number	Service Cloud case ID	Description
7554	00683744	You can now capture objects from the Google Chrome browser using the Recorder capture action. The plug-in not installed or disabled error is no longer displayed.
7554	00672446, 00671782, 00671065, 00683870	When you upgrade to this release from an earlier release (for example, Enterprise A2019.16), the Elasticsearch OpenDistro error message is no longer displayed. Also, the previous <code>application_log</code> indices from Elasticsearch are deleted to free up disk space for the upgrade.
7554	00690003	You can now use the Terminal Emulator package without any change in the screen resolution for the mainframe terminal type TN3270. Previously, the screen resolution was not supported for terminal type TN3270.
7554	00679244	In Dictionary and List packages, you can now use the Datetime data type in the source dictionary variable field of the Assign action. Previously, an error was encountered during bot execution if you used Datetime data type in the source dictionary variable field.
7554	00673591	Fixed an issue in the Task Bot package where the system selected all the input variable options when the user clicked away from and returned to the action.
7554	00684905, 00703481	A TaskBot now runs as scheduled and no longer shows the device status as Picked at runtime on the View task in progress (Activity) page when the TaskBot is running.
7554	00573081	The audit log page in the Enterprise Control Room now records all entries related to bot deployment. Also, when a parent task with many child bots is deployed, the audit log now shows correct entries. Previously, some audit log entries were missing for bot deployment and if a parent task with many child bots was deployed, the entries displayed were incorrect.

Known limitations
Enterprise A2019 does not yet support the counter behavior of the <code>\$Excel Cell Row\$</code> system variable in 11.x when the variable is used in the Loop command and the Each row in Excel Dataset option is selected. This behavior is available in 11.3.0 and earlier versions by default, and in the Version 11.3.1.2 and later versions when the <code>retainexcelcellrowlegacybehavior</code> tag in the <code>AASettings.xml</code> file is set to true.

Known limitations
A bot fails when it runs an action that reloads the web page, such as the Recorder > Capture action when it is used to click a link or the Browser > Open action, followed by a Browser > Run JavaScript or Browser > Extract source action. You must add a delay of at least 5 seconds to give the browser time to load.
A bot fails when it runs the Browser > Close action to close the last Google Chrome window and the window contains only one tab. Use the Tab or All browsers options instead.
A bot can return only a maximum of 3 MB to an output variable. Workaround: Store the bot output on the device, such as in a .txt file. If the output must be shared across multiple Bot Runners, store the output in a shared drive.
The AISense Recorder fails if you manually upgrade the Recorder package version, such as by importing a bot that contains a Recorder package version from a more recent build than the destination Enterprise Control Room. Always upgrade the Recorder package through the Enterprise Control Room.
If you install the Google Chrome extension in the Microsoft Edge browser, it causes recording and runtime errors in bots that interact with the Google Chrome browser. Even if you did not manually install the Google Chrome extension, the auto-sync settings in the Microsoft Edge browser might have automatically installed the extension. If the Google Chrome extension is installed in the Microsoft Edge browser, you must remove the Google Chrome extension from the <code>edge://extensions</code> page.
When the regex Case insensitive flag is enabled for actions that include the window title, a recapture of the application window fails.
The input parameters for DLLs are not automatically passed from the parent bot to the child bot in Enterprise A2019 for migrated MetaBots.
Workload automation limitation for manual Credential Vault mode (Service Cloud case ID: 00711410) You might face issues when migrating your workload automation if the Enterprise Control Room is configured to use a manual mode for Credential Vault. Workaround: As the Enterprise Control Room administrator, perform the following steps: 1. Change the Credential Vault mode to express from manual in the Enterprise Control Room database configuration table. 2. Add the credential vault key to the <code>CredentialVault.dat</code> file in the Enterprise Control Room server repository. 3. Restart the Enterprise A2019 Automation Anywhere Control Room Service. 4. Reregister the Bot agent or restart the Bot agent service.

Automation Anywhere Robotic Interface (AARI)

New features
New AARI web package Use the AARI web package to perform actions such as assign, query, and cancel tasks; create and query requests; and retrieve a list of team members. AARI web package on page 519
Filter by time You can now filter your requests and tasks by time: • Requests tab: Use the Created and Updated options in the Filter window to select any dates. • Tasks tab: Use the Task created and Task updated options in the Filter window to select any dates. Filter and search for a request on page 924 Filter and search for a task on page 926
View updated dates • Use the new Updated column in the Requests tab to view the dates and time of a request that was last updated. • Use the new Task Updated column in the Tasks tab to view the date and time of a task that was last updated.
Variable options In the Insert a variable window, the Variable field now shows child elements of available references, which include Dictionary, List, Record, and Table variable types.
Delete a request AARI administrators, managers, and users can now delete requests created by the AARI process. The AARI administrator can delete any requests. AARI managers can delete requests of the team for which they are the owner. AARI users can delete only the requests they have created. Delete a request on page 922
Automatically assign managers and users Users can now select the Auto assign this task option in the Human Task to assign managers or users to the task. Users can also select the Auto assign the target task to option in the Go to element to assign managers to the task. Create an AARI process on page 912

New features

Enhancements to elements in the form builder

- Time element: Includes the time element in a form.
[Using the Time element](#) on page 943
- Date element: Set the date format of the user machine as the default format for the date element in the form.
[Using the Date element](#) on page 934
- Select file element: Drag the selected file into the form during bot runtime.
[Using the Select File element](#) on page 936
- Password element: View the password you enter in this field during bot runtime.
[Using the Password element](#) on page 939

Updates to interactive forms

- Use the Change Form Title to edit or change the title of the selected form during bot runtime.
- Use the Validate form option now for the Table element.

[Interactive forms package](#) on page 665

Changed features

Process package renamed to AARI web package

The Process package is now renamed to the AARI web package, which includes the Create a Request action and additional new actions.

[AARI web package](#)

Enhancement to process management page

In the process management page, the AARI admin can now edit the Process Title and Process Description metadata. You can now add a title and provide a short description for the process.

Enhancement to the activity page

All the Bot Runner (attended or unattended) trigger deployments in queue are now displayed in the Activity > In progress page.

[Activity](#) on page 1056

Edit check box, radio button, and drop-down form elements in process editor

In the process editor, you can now edit and update the List of options and Default value fields for the following form elements: Checkbox, Radio button, and Dropdown.

Fixed features	
Service Cloud case ID	Description
00678572	You can now view the strict-transport-security header when using the AARI web interface. This attribute informs the web browser to automatically convert websites requesting HTTP to load HTTPS instead in order to comply with the HTTP Strict-Transport-Security (HSTS) policy.
--	The Display message field in the If/Else pair action now displays the status message in request view. Previously, the status message was not displayed in the request view.
--	When you access AARI through the web interface, the Request ID and Task ID now correctly identify the data as numeric data type and sort it accordingly. Previously, the data was considered as string type and the sorting was not appropriate.
00646148	A bot is no longer deployed multiple times when the files and folders triggers are used.

Known limitations
When a user with a Citizen Developer license deletes an event trigger, this activity is not captured in the Audit log tab.
When you delete a request from the Request tab, the tasks associated with the request are not deleted and they are displayed in the Tasks tab.
If you click the refresh option in the Tasks tab and navigate away and back to the tab, the task filter applied does not remain the same. The filter always switches to Pending status.

Discovery Bot

New features
Use Model option for system-generated views You can now use the Model option to compare and find the best aggregated view for your recordings. Use this option to save as many views with different combinations as required. You can also save the view as a manual view to further customize your view and compare side-by-side. Select either an Easy or Strict model so that you can view recordings where the steps are the same versus recordings with different results with more branches in the process path. Create a process view with branches and opportunities on page 976

New features	
Use Filter option for system-generated views You can now use the Filter option to use a set of values to compare different sections of a process across various recordings by selecting a specific path and step filter. Used along with the Model option, the path and step filter options for a system-generated or manual view can help you to determine and decide on a good candidate for automation. Create a process view with branches and opportunities on page 976	
Use toggle frequency counter option for system-generated views You can now use the toggle frequency counter to display the number of recordings that a particular path takes in the flow in a system-generated view. Use this option to help you understand the frequency of the path compared to other recordings or views. Create a process view with branches and opportunities on page 976	
Remove recording screenshot for data privacy Use the Screen option (icon) to display or hide the recording screenshot before submitting the recording for the analyst to review. Use this option when you do not want to share personal image details with the analyst. Record a Discovery Bot business process on page 968	
Download PDD from the Opportunities table You can now download a process definition document (PDD) for an opportunity directly from the Opportunities table listed on the Opportunities page. The PDD is automatically generated when the opportunity is created. After the PDD is generated, the field changes from generating PDD to Download PDD. You can then download and save the document. Review opportunities and convert to bot on page 983	

Changed features	
Screenshot image is increased The screenshot image is now increased to allow for better readability of captured steps. You can now use the scroll wheel to get a zoomed-in view of the step.	
The Export to Word option now supports 2000 steps.	
The Convert to Bot option now supports 2000 steps.	

Fixed features	
Service Cloud case ID	Description
--	The Delete icon is now properly visible in the edit recordings screen in Internet Explorer.
--	You can now change the zoom level in any canvas using the two-finger swipe on the trackpad of the Aggregated and Comparison tabs.

Fixed features	
Service Cloud case ID	Description
--	The red highlight is now visible on the captured screenshots from the Recordings page and from the preview pane from the Aggregated and Opportunity tabs for analyst review.

Known limitations
When upgrading to this release, you must regenerate all PDDs created in Enterprise A2019.17. Click Retry PDD Generation to regenerate the PDDs.
If you want to display an image that you have hidden and saved, you must first click the Screen icon and then click Save to display the image again.
In the Opportunities table, the search field and filter drop-down option are not available for the Process and Owner columns.
When an opportunity is created for a system-generated view with filters applied, the filter is reapplied on the view displayed within the Aggregated tab from the Opportunities page. The filter incorrectly displays No recording data. The Convert to Bot and the Download PDD options are not affected.
When a recording is canceled, the recording is incorrectly incremented and displayed on the process tile in Process Cycle.
You cannot approve a recording with more than 500 steps.

IQ Bot

New features
New IQ Bot Extraction package IQ Bot A2019 On-Premises and Cloud IQ Bot A2019 now includes the IQ Bot Extraction package for processing invoices. The package uses Bot Runners on your local device instead of an IQ Bot server for processing. IQ Bot Extraction package on page 676

Changed features
Enhancement to Migration Utility When you now export an IQ Bot archive (.iqba) file, only a single document associated with every available bot (group) training is exported.
Enhancement to IQ Bot Classifier package The IQ Bot Classifier package now supports all languages supported by ABBYY FineReader Engine. Previously, only English language was supported. ABBYY FineReader Engine OCR supported languages

Fixed features	
Service Cloud case ID	Description
00668625	When you upload documents containing digital signatures to learning instances, the Designer now displays the correct success or error message.
00619139, 00695157	When you now run a bot and try to edit it while it is still running, the following correct message is displayed: <code>Staging Documents for this Vision bot is in progress. Please try after some time.</code> Previously, the following incorrect message was displayed: <code>Learning instance not found.</code>
00408482	You can now successfully export a custom domain created using Korean or other Asian languages.
00669197, 00681599	Node.js is now upgraded to version v10.22.1 to fix a security vulnerability.
--	Fixed an issue that caused the following error: <code>failed to upgrade DB -1.</code> You can now install IQ Bot in express mode without any errors.
00633197	During validation, if there is an error in the validation pattern, the validation process now fails, the correct message is displayed, and error logs are generated.
00689326	You can now view the extraction results correctly even when the bot is trained with check box fields.
00666456	IQ Bot machine learning services are now correctly installed when you install IQ Bot.

Known limitations
IQ Bot On-Premises and Cloud The following limitations apply to the IQ Bot Extractionpackage: • If you process documents that do not belong to any created groups, they are not displayed in the Details page of the learning instance. • The Checkbox extraction option is not supported. • Some of the input invoices are not processed when you set up WLM with shared input and output folders.
IQ Bot On-Premises and Cloud When creating learning instances, IQ Bot sometimes does not restrict users from creating duplicate fields.

Known limitations
IQ Bot On-Premises and Cloud Occasionally IQ Bot fails to execute Python logic for tables other than the default one. Workaround: Retry after you perform one of the following actions: - Click Save and close. - Click See Extraction results.
IQ Bot On-Premises and Cloud In PDF documents containing multiple pages, at times the segments do not display correctly on all pages. Workaround: Use PDFBox OCR to process the documents.
IQ Bot On-Premises and Cloud For the Get page content action of the IQ Bot Pre-processor package, if you select the Create variable option from the List of strings extracted from page menu, you can only use Any from the Subtype drop-down menu.
IQ Bot Community Edition, On-Premises and Cloud If you use Internet Explorer version 11.0.973.17763 to log in to IQ Bot A2019 and open See extraction results for a learning instance, you cannot open or download the <code>Preview.csv</code> file.

Bot Insight

New features
Access Bot Insight data from Tableau Use the Tableau connector in Bot Insight to access business and operational information. The Tableau connector connects to the Bot Insight APIs to create various business and operational metrics that you can analyze and visualize within Tableau. Configure Tableau web data connector in Bot Insight on page 1340
Assign Bot Insight license (Service Cloud case ID: 00651973) Assign the Bot Insight license to users to enable them to view and perform tasks on the Business dashboard. You can now assign the license on a per-user basis, irrespective of the assigned roles. Enterprise A2019 licenses on page 392

Supported packages

Package	Version
Application	2.1.0-20201112-22332
App Integration	2.3.0-20201210-171315
Active Directory	2.1.0-20201112-223323

Package	Version
Boolean	2.1.0-20201126-165109
Browser	2.3.0-20201211-222811
Clipboard	2.1.0-20201126-165124
Comment	2.3.0-20201126-165125
CSV/TXT	2.3.0-20201126-165126
Database	2.2.0-20201112-223343
Data Table	2.5.0-20201201-130615
Datetime	2.2.0-20201126-165136
Delay	2.2.0-20201126-165137
Dictionary	3.2.0-20201126-165138
Run DLL	3.3.0-20201126-165850
Email	3.2.0-20201120-062604
Error handler	2.3.0-20201126-165148
Excel basic	2.4.0-20201126-165604
Excel advanced	5.3.0-20201208-090251
File	3.2.0-20201126-165151
Folder	3.1.0-20201126-165154
FTP / SFTP	2.2.0-20201115-072759
Image Recognition	2.2.0-20201117-081754
JavaScript	2.4.0-20201126-165412
Simulate keystrokes	2.5.0-20201112-223902
Legacy Automation	3.2.0-20201124-064544
	1.5.0-20201125-004358
List	2.2.0-20201126-165427
Log To File	2.2.0-20201126-165428
Loop	2.1.0-20201126-165429
Message Box	2.1.0-20201126-165430
Mouse	2.2.0-20201112-223917
Number	2.1.0-20201126-165444
OCR	2.3.0-20201126-081210
Office 365 Excel	2.2.0-20201104-062559
Office 365 Calendar	2.1.0-20201111-162101
Office 365 OneDrive	2.2.0-20201126-165550
PDF	2.6.0-20201126-165555

Package	Version
PGP	2.2.0-20201126-165557
Ping	2.1.0-20201126-165559
Play Sound	2.1.0-20201127-115706
Prompt	2.2.0-20201109-192507
Python Script	2.4.0-20201208-064944
Recorder	2.10-20201215-211402
REST Web Service	3.2.0-20201112-224735
SAP	2.2.0-20201126-165852
Screen	2.2.0-20201126-165855
SNMP	2.1.0-20201126-165859
SOAP Web Service	3.2.0-20201123-093411
String	3.1.0-20201126-165909
System	3.0.0-20200921-090225
Terminal Emulator	3.6.0-20201213-084139
VBScript	2.4.0-20201208-065526
Wait	3.1.0-20201126-165922
Window	2.3.0-20201123-093430
Workload	2.1.0-20200825-071644
XML	2.1.0-20201126-165927

Related reference

[Community Edition A2019.18 Release Notes](#) on page 197

Enterprise A2019.17 Release Notes

Release date: 2 December 2020

Review the new features, changed features, fixed features, security fixes, known limitations, and supported packages in the Enterprise A2019.17 (Build 7103) release. IQ Bot is on Build 7082.

- [Enterprise A2019](#)
- [AARI](#)
- [Discovery Bot](#)
- [IQ Bot](#)
- [Bot Insight](#) on page 69
- [Supported packages](#)

Migration features



Important: Migration to Enterprise A2019 ([currently available only to customers in the Migration Early Adopter Program](#))

Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program or a timeline for when migration will be available to all customers, contact your Automation Anywhere representative.

The following features apply to both 11.x and 10.x:

Obtain information about upcoming support for commands and variables

Bot Scanner provides information about the upcoming Enterprise A2019 release in which a specific command or variable will be supported or available.

Migrate MetaBots with screens

Migrate MetaBots that contain screens as assets. You can migrate screens based on the Java technology and captured using the Object, Image, and Coordinate play modes.

[How MetaBots are migrated](#) on page 498

View progress of bot migration

A progress bar is displayed in the migration results tab when the system starts migrating the bots.

Migrate bots that use SAP command

You can migrate 11.x bots that use the GUI Automation command to capture various objects from an SAP application.

[Package mapping for migration](#) on page 453

Migrate bots that use the following attributes:

- Regular expression to search for files on which you want to perform an operation.
- Variable to specify the child bot you want to run.
- System variables to retrieve information about a device's settings and its performance.
- The Save header To option and containing array and dictionary variables in the REST Web Service command to store the response header.
- Bots that contain failure responses from the REST Web Service command by using the Capture failure response option in Enterprise A2019. For 11.x bots, this option is enabled by default.

[REST Web Service package](#) on page 760

- Variables with names containing Arabic or Russian characters, or Japanese double-byte numbers.

[Unicode range supported in variables](#) on page 876

The following features apply to 11.x only:

Increment loop counter value by 1

The `$Counter$` variable used in loop in 11.x bots is replaced with the `$Condition-Counter$` variable in the migrated bots and value for the variable set to 1.

Service Cloud case ID: 00659314

View audit log migration reports

View the status of audit log migration and other related information in the All migrations page. View additional information by using the View migration option for each audit migration instance.

[Migrate 11.x audit logs](#) on page 437 | [View migration reports](#) on page 507

Migrate 11.x Bot Insight data and dashboards

- Migrate 11.x Bot Insight data and published dashboards of bots enabled for analytics by using the Bot Insight pre-migration utility and Bot Migration Wizard.

[Export 11.x Bot Insight dashboards for migration](#) on page 436 | [Migrate Enterprise bots](#) on page 495

- View Bot Insight migration reports from the new Bot Insight results tab on the Administration > Migration > View migration page.

[View migration reports](#) on page 507

Migrate bots that use the following attributes:

- MetaBots with DLLs that use credential variables of string, character, or byte data type.
- The Launch website action of the Browser package to open a website in the Microsoft Edge browser.
- Shared session to establish a connection with a terminal server or open a Microsoft Excel spreadsheet and close the shared session from the child bot.
- IBM 5555 B01 and C01 models for TN5250 terminal types and the Default terminal for the VT100 terminal type.

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Connect to EWS server with OAuth authentication A new authentication is available for the Exchange Web Services (EWS) protocol with OAuth. You can use the OAuth authentication and enable your EWS-managed API applications to access Exchange online in Office 365. Using the Connect action on page 588
Google Cloud Platform supported for On-Premises deployment You can now host the Enterprise Control Room, and create and deploy automation on devices configured to use the Google Cloud Platform environment. Operating system, environment, and platform supported for Enterprise Control Room on page 295
LDAP channel binding for enhanced network security in On-Premises deployment Enterprise Control Room supports LDAP channel binding in order to comply with a security release from Microsoft. LDAP channel binding provides enhanced security for network communications between an Active Directory and its clients. It provides a more secure LDAP authentication over SSL and TLS. Configure LDAP channel binding on page 381
Use Bot agent with AWS WorkSpaces (Service Cloud case ID: 00652474, 00676112) You can now deploy bots on Bot agent devices that are configured on AWS WorkSpaces. Bot agent compatibility on page 403
VT220 terminal type supported in Terminal Emulator To establish a connection and communicate with another machine, you can now use the VT220 terminal for sending and receiving text. Using the Connect action on page 811
Permission to cancel checkout in Enterprise Control Room Use the Cancel checkout permission to cancel checked-out TaskBots or files from the public or private workspace. • In the public workspace, the status of the bot changes to public. • In the private workspace, the status of the bot changes to new if any changes were made to the bot. If there are no changes, the bot is replaced with a clone. Check out a bot on page 858

New features
Enhancements to the Recorder - Record a task using the Universal Recorder or AISense Recorder from a single point of entry. Both recorders are now managed through a single package, which enables faster and more efficient updates. - You can now record tasks in a Microsoft Edge browser that runs on Chromium (versions 79 and later). - Use the AISense Recorder Define option to capture an object that is only visible when you hover the mouse over the object. - Use the Resize window option in the Recorder > Capture action to set the window width and height. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, thus increasing the likelihood that the bot identifies the target object. Get started with recorders on page 836 Universal Recorder supported applications and browsers on page 841 Using the Capture action on page 758
Use shared session in Terminal Emulator Use the new Shared session option to pass the exact state of an application to a concurrently occurring TaskBot or MetaBot logic. For example, instead of connecting to the same application multiple times for different tasks, you can use the option to connect to the application using a single task, thus optimizing your automation logic in the long run. Share session between TaskBot logic on page 818
Share an Excel session between bots Use the Set session action from the Excel basic or Excel advanced package to assign an Excel session to a variable, and then pass that variable from a parent to a child bot. This enables the child bot to access the worksheet opened in the parent bot. Excel basic package on page 601 Excel advanced workbook operations Example of sharing an Excel session between bots on page 806
New option for Run Task In the Task Bot package, you can now use the Run action with an option to repeat the selected task until you choose to stop it.
New search for roles in User Management API Use the new <code>search_for_roles</code> API in the User Management APIs in Swagger to obtain a list of all the roles or details for a specific role. Search for roles API on page 1258
Capture response status of REST API In the REST Web Service package, you can capture the response status of the REST API in the dictionary variable. The dictionary variable now shows the response key with its value.
New option for REST Web Service (Service Cloud case ID: 00489741, 00646436) Use the Capture failure response action in the REST Web Service package to capture response details in the response body.

New features

Use regular expressions in packages

You can use regular expressions (regex) in certain actions to support pattern-based search in a file, folder, or Windows title. Regular expressions are supported in the actions of the File and File and Folder packages such as Copy, Delete, Rename, Print Multiple files, and Zip.

You can also use regular expressions in some packages that support the wildcard character in their window titles.

The following packages and actions support regular expressions:

- Wait
- Image Recognition
- Simulate keystrokes
- Mouse > Click action
- Legacy Automation > Manage windows control
- OCR
- Screen
- Recorder > Capture
- Run DLL > Run function (Legacy), Run function
- Window: Activate, Close, Maximize, Minimize, Resize

[Using Copy action for file](#) on page 628 | [Using the Capture action](#) on page 758

Support for overloaded functions in DLL package

The DLL > Run function action can now handle .dll files that contain multiple functions of the same name. The action calls the function based on the number of parameters passed.

[Using the Run function action](#) on page 582

New actions for SAP captured objects

Use new actions that are available for Tree, Tab, and Label controls to perform operations for the various objects captured from an SAP application.

[Actions supported in various SAP versions](#) on page 771

New features

Enhancements to elements in the form builder

- Image element: Upload image files to the form using this element.
[Using the Image element](#) on page 937
- Button element: Validate all the fields in a form using the Validate all form fields when this button is clicked option.
[Using the Button element](#) on page 933
- Password element: Use one of the following formatting options:
 - Standard: set the character limit and choose additional security options.
 - Custom: add a custom password on the Regular expression page.
[Using the Password element](#) on page 939
- Rich Text Editor element: Use this element in the Set action when creating a bot in order to add or overwrite the value of a variable.
- Table element: Includes the following updates:
 - New data types for Column settings:
 - Date
 - Number
 - Dropdown
 - The following actions, which you can use during bot runtime:
 - Set action to add rows to the table.
 - Trigger events to add rows and delete rows.
 - Sort table columns.
- Text Box element: Choose one of the following formatting options:
 - Standard: set the character limit for this field.
 - Custom: add a custom password on the Regular expression page.
[Using the Text Box element](#) on page 942
- Select file or Snapshot element: When you click Preview during bot runtime, the system default application is used to display the selected file.
[Using the Select File element](#) on page 936 | [Using the Snapshot element](#) on page 940

Enhancement to List view of bots

In the List view of the Bot editor, you now drag a selected action to the task logic.

New features

Import 11.x bots to A2019 (Service Cloud case ID: 00512847)

- BLM Import feature: The Bot Lifecycle Management (BLM) import feature enables you to import 11.x bots from multiple 11.x Enterprise Control Room instances to a single Enterprise A2019 instance by using the `aapkg` file.
[Bot Lifecycle Management](#) on page 1160 | [Import bots](#) on page 1163
- BLM Import API: You can also use this API to import 11.x bots to the Enterprise A2019 instance by uploading the `aapkg` file. However, you can import a password-protected `aapkg` package only by using the Import API.

[Bot Lifecycle Management API](#) on page 1198 | [Import files using API](#) on page 1200

New endpoint in License API

Use the List details of Control Room licenses endpoint to retrieve metadata including the license type, number of available licenses, number of licenses used in a specific Enterprise Control Room instance, and number of licenses used in all Enterprise Control Room instances.

[License API](#) on page 1221 | [List details of the Enterprise Control Room licenses](#) on page 1223

Programmatically manage device login credentials

Use the Login setting endpoint of the Credential Vault API to set or update the device login credentials to allow bots to run on the device.

[Set device login credentials API](#) on page 1203

Store multiple lines of text in a string variable

You can use a string variable containing multiple lines of text in the following actions:

- String > Assign
- String > Extract text
- String > Compare
- String > Lowercase
- String > Replace
- String > Reverse
- Log to file
- Message box
- The string condition in the If, Wait, and While actions

Arabic, Japanese, and Russian characters supported in variable names

You can now create variables with names containing Arabic or Russian characters, or Japanese double-byte numbers.

[Unicode range supported in variables](#) on page 876

Changed features
Configure granular security for Bot agent (Service Cloud case ID: 00653807) Starting from this release, only registered Bot agent device IP addresses that are added in the Allowed IP addresses list of the Network Settings can connect to the Enterprise Control Room. In previous releases, devices from all subnets and IP addresses within the corporate network were allowed to connect to the Enterprise Control Room URL. Network access on page 1135
Update to Excel advanced package The Open action in the Excel advanced package now opens a Microsoft Excel spreadsheet even when a file extension is not provided.
Disable clone and view content permissions for check-in (Service Cloud case ID: 00656157) When the Check in permission is selected, the Clone and View content permissions are also automatically selected. As an Enterprise Control Room administrator, you can now disable the Clone and View content permissions when required.
Associate triggers only with attended Bot Runners Triggers are primarily for users with attended Bot Runner licenses. Associating triggers with unattended Bot Runners is not supported by Automation Anywhere. However, if you associate triggers with unattended Bot Runner users, they must provide the login credentials of the default device.
Additional license support enhancements Enterprise Control Room administrators are enabled to install a new GUID license before an existing license expires.
Change in edit device permission Starting from this release, the permission to edit devices is not available in the system-created AAE_Basic role by default in the Enterprise Control Room. A user has to select the Edit the device(s) permission separately. Devices on page 1067

The following table lists the fixed features and the builds in which they were fixed (Build 7103 is the latest build, and Build 7096 is the previous build). The fixes are cumulatively available in the latest build.

Fixed features		
Build number	Service Cloud case ID	Description
7103	00684905, 00703481	A TaskBot now runs as scheduled and no longer shows the device status as Picked at runtime on the View task in progress (Activity) page when the TaskBot is running.
7103	00676476	An error is no longer encountered when you run a child bot that contains a Japanese full-width space character in the name.

Fixed features		
Build number	Service Cloud case ID	Description
7103	00689935, 00689381, 00690368, 00690217, 0069053	License server syncing error generated when control room licenses and licenses stored on a server are updated on different schedules. This issue has been fixed. Should an error message appear, click "Sync licenses from Server" for any new licenses in production to manually sync the licenses.
7096	00667396, 00670001, 00653771, 00671553	Bot Scanner no longer encounters an error when scanning bots with non-ASCII characters in their name.
7096	00659334	The Offset from match option in the Image Recognition package now works correctly in migrated bots.
7096	00669166	You can now migrate large bots (for example, with 30+ dependencies and 500+ lines) using the Bot migration package. The system no longer encounters an error when migrating a bot that contains a large number of nested IF/ELSE commands.
7096	00659349	You can now migrate bots with special characters in their names.
7096	00670985, 00674145	The system no longer encounters an error due to Bot Store credentials when you migrate from Version 11.3.3 or a later version to Enterprise A2019.
7096	00679817	An unknown error is no longer displayed when you are migrating a bot that the Bot Scanner listed as ready for migration.

Fixed features		
Build number	Service Cloud case ID	Description
7096	00457898, 00488494	You can now register a device with a username that contains non-ASCII characters such as Korean language characters.  Note: Before upgrading the Bot agent to the current version, ensure that the registered device is configured to use non-ASCII characters. Configuring post-installation settings on page 371
7096	00611887	You can now download an exported bot package using the Internet Explorer browser by opening the download link received in the email. You can also do this from the Activity > Historical page.
7096	00647932	When you create a bot using the Get method action in the REST Web Service package, the UTF-8 character set is now supported. Therefore, Korean characters are processed correctly in the REST API response. Previously, UTF-8 characters were not supported.
7096	00641126	You can now use the Get single cell action in the Excel basic package to extract the date correctly for the Japanese date format. Previously, the Japanese date was displayed in double quotation marks.
7096	00634102	You can now use the Simulate keystrokes package with the Alt+F4 key and set a longer delay value between each keystroke. Previously, the bots displayed an error when a longer delay value was set with the Alt+F4 key.
7096	00655739	In REST Web Service, the Rest API Get call now works properly even when the encoded URL string has special characters such as double quotation marks. Previously, the Rest API Get call failed when the URL string had double quotation marks.

Fixed features		
Build number	Service Cloud case ID	Description
7096	00653944	The String package now shows the correct output when you use the loop action to read a file name that does not have an extension. Previously, when the file did not have any extension, the filename extracted using the loop displayed an incorrect output.
7096	00677941	When an optional field (Mark field required is not selected) is now left blank, a form is validated without any error messages during bot runtime.
7096	00662011	When using the files and folders trigger, you can now use any available network drive to start a bot.
7096	00666441, 00673888	For a folder trigger, you can now select a folder name containing a space character and the bot runs successfully without encountering any issues. For example, you can select a folder called 'Sales chart'.
7096	00622100	When Simulate keystrokes is enabled for a hot key trigger, you can now start a bot multiple times using the associated hot keys without encountering any issues.
7096	--	If an element is marked as Read-only on the form builder screen, a validation error is no longer displayed for that field during bot runtime.
7096	00570660	You can now use Windows forms with the Run function action of the DLL package.
7096	00624644	The system no longer encounters an error when you upgrade from an earlier version of Enterprise A2019 to a later version when the settings are preserved and the installation path is not the default location.
7096	00670008	You can now pause or resume a task from the Activity > In progress page.

Fixed features		
Build number	Service Cloud case ID	Description
7096	00667210, 00672875	In the Excel advanced package, you can now use the Go to cell action even if the Excel sheet does not have any data or an active cell is out of the worksheet range. Previously, an issue was encountered when you used the Go to cell action and chose the cell option as Active cell with the Beginning of the row, End of the row, Beginning of the column, or End of the column option.
7096	00659098, 00669437	You can now edit the Start date of an existing schedule to today's date, provided the start time is set before the bot is scheduled to run.
7096	00671392	You can now stop a bot that is in progress using the Stop option from the In progress (Activity) page or the Stop option on the runtime window that appears when the bot is being executed.
7096	00647761	You can now define a list variable of subdata type Boolean or datetime within an action. Previously, the bot encountered an error in this scenario.
7096	00671478	Fixed an issue in the Task Bot > Run action where the value of an input variable disappeared when the user clicked Save. This issue only occurred when the Current Task Bot option was selected.
7096	00663719, 00635437	Fixed an issue where the OCR package was missing from Enterprise Control Room instances hosted on Microsoft Azure. The connection with the Microsoft Azure database timed out before the OCR package .jar file could complete the upload.

Fixed features		
Build number	Service Cloud case ID	Description
7096	00631133, 00636174	In the Wait package, the Wait for condition action in the recorder object no longer waits indefinitely during bot execution. If the required window or its control does not exist, the bot waits for the required window or its control for the time specified in the Wait for control field. If the required window or its control is not found within this specified time, the bot continues to perform the next set of actions.
7096	00628863	Bot files or dependencies are no longer lost when you check in or check out a bot from the private or public workspace when the Elasticsearch service is running and not in index read-only mode. Previously, an error occurred when a bot was either checked in or checked out, and the bot files or dependencies were lost and could not be recovered.
7096	00673520	When a bot is deployed through RDP with a predefined screen resolution, the RDP resolution settings are now applied correctly during bot execution. Previously, the bot was executed with an interchanged resolution (the height and width pixels were interchanged).
7096	00670346	After you edit a bot schedule, the input value of a variable in the bot no longer has to be reinitialized and the bot does not show the default output value for the variable when it is executed.
7096	00653056, 00651853, 00647949, 00657465, 00670024	The In progress activity is now displayed correctly for bots deployed on Bot Runners by any user.

Fixed features		
Build number	Service Cloud case ID	Description
7096	--	When developing custom packages, you can now set your name in the vendor column. To set the name, update the <code>author</code> property of the <code>build.gradle</code> file, as shown below: <pre>packageJson{ artifactName = project.name group = "\$groupName" author = "<entername>" }</pre> Leaving the field empty shows the vendor name as unspecified.
7096	--	Multiple users can now simultaneously run a bot associated with a form without encountering any issues on the same Bot Runner machine.
7096	--	You can now migrate 11.x bots that contain variables that are in a different letter case (uppercase or lowercase) than those in A2019. Variables are case-sensitive in Enterprise A2019 but not in 11.x, which previously resulted in an error.
7096	00592758	You can now create a variable with a name that starts with a numerical character.
7096	00670994	You can now register with the Enterprise Control Room from a multiple-user device configured for Active Directory users.
7096	00673043	When you specify a value in the <code>numOfRunAsUsersToUse</code> parameter of the <code>Bot Deploy API</code> , the weighted system algorithm now assigns tasks to the Bot Runners with the least number of tasks queued and currently running. Previously, the algorithm did not correctly calculate the weight of queued and running tasks, which resulted in an inefficient task allocation to the same one or two Bot Runners.

Known limitations
When a bot opens a website inside a loop, the Recorder Capture action fails after the execution of Launch Website. Workaround: Add a delay of a few seconds in the loop between the Launch Website and Recorder Capture action.
The Recorder Capture action does not support object recapture for the AISense technology type.
The system does not display a value for a session variable when the variable is selected as Watched variables in Debug mode.
The session variable returns a blank value when it is used as output in a bot and the bot is deployed using the Bot Deploy API.
After an upgrade to the latest version of Enterprise A2019, the bot might encounter an error if you are using the Close action of the Window package version 2.1.0-20200813-181240 or earlier. Workaround: Add a delay of 50 milliseconds after the Close action in the bot.
The Recorder package takes a long time (for example, approximately 6 hours) to upload to a remote application repository path of an On-Premises Enterprise Control Room deployed on Microsoft Azure. Workaround: 1. Before you install or upgrade to this version, configure the repository path in a local directory of the Enterprise Control Room node to upload the package. 2. After installing or upgrading, verify that all packages are available in the Packages page of the Enterprise Control Room. 3. Change the repository path to a remote file share.
The AISense Recorder fails if you manually upgrade the Recorder package version, such as by importing a bot that contains a Recorder package version from a more recent build than the destination Enterprise Control Room. Always upgrade the Recorder package through the Enterprise Control Room.

Automation Anywhere Robotic Interface (AARI)

New features
Run a process in private workspace You can now run a process in your private workspace by using the Run option in the process editor. The bots in the process are then executed on the default device of the Bot Creator. Automation Anywhere Robotic Interface processes on page 910.
Use the Data Privacy tag field The Data Privacy tag enables users to generate hidden custom output in their process tasks (Start panel, Human Task, and Bot Task). Users can enter the variables for this field during runtime with values. In the web portal, the AARI admin can use this tag to check for requests or tasks by using personal user data. The admin can also filter using this field. Create an AARI process on page 912 Filter and search for a request on page 924 Filter and search for a task on page 926

New features
Use variables types You can now use new variables in the process editor such as createdOn and updatedOn (DateTime), id (Number), and title (String). These variables are part of a data flow (workflow engine) that moves data between each step of a process and requires variable input for the process to run properly. AARI variable types on page 915
View previous selected tasks AARI users can now reference selected actions of their tasks. When they view a submitted task in request view, a check mark indicator is now displayed next to the buttons that are selected.

Changed features
Configure scheduler user to allocate device pool to AARI on the web interface In the AARI Settings page, the AARI administrator can now configure a scheduler user to allocate the Enterprise Control Room resources (devices and unattended Bot Runners) to AARI on the web interface. The scheduler user must have View my bots and Run my bots permissions and have access to a device pool and Bot Runners. The AARI process can then use those resources for each bot deployment. Configure scheduler user for AARI on the web on page 929.
End point display In the Completed panel, the End point has a new display option Update request title that enables the user to update the request title. When the user updates the Display message field, the update is now reflected in request view. Create an AARI process on page 912
Use F2 to insert variables You can now use the F2 keyboard shortcut to insert variables in the process editor.

Fixed features	
Service Cloud case ID	Description
--	The Task display name option in the Start panel is now set to Request Creation by default. Any name changes by the user is now reflected in the request view.
--	The Feed data into form table in the process editor now works properly and users can now edit the field.
--	In a form that contains a Number field set to a 10-character limit, when you enter the maximum character limit (for example, 1234567890) in the number field in request view, the number values are now accepted.

Fixed features	
Service Cloud case ID	Description
--	When you create a process with a form that contains a Date element, the Condition option in the If/Else pair action now allows you to enter a variable. Previously, the option did not allow you to enter a variable.

Known limitations	
In the process editor, if a bot contains an incorrect input variable, the properties panel highlights the wrong element: Browse in the Select Task Bot field is highlighted instead of the incorrect variable. Workaround: Hover your mouse over the red icon next to the Bot Task in the process editor to see the error.	
In the process editor, if you replace the Go to option with an End Process, the End Process icon does not display the status (Completed, Failed, Canceled) correctly. Workaround: Click the End Process icon and change the status.	
A Bot Task cannot pass data to the next task (Human Task or Bot Task) if it contains Japanese characters in its output variable name. Workaround: Use English characters for the variable name in the Bot Task.	
If a scheduler user has multiple sets of configurations (device pools and Bot Runners), due to a mismatch in the selection of the device pool and the Bot Runners, the bot deployment fails. Workaround: Set Bot Runners in the Run As section of the consumer role. Ensure the scheduler user has access to only one device pool and one consumer role that has run-as users.	
When you access AARI through the web interface, the Request ID and Task ID consider the data as string type instead of numeric data type and sorts it accordingly. For example, if a Request ID or Task ID starts from 1 through 30, the IDs are sorted as string data type (1, 10, 11, 12, 13, ..., 2, 22, 23, ..., 30) instead of numeric data type (1, 2, 3, 4, ..., 30).	
In some bot development failure scenarios, for example, files are not found or the scheduler user does not have access to the bot file, bot development fails by timing out after one hour instead of displaying an error.	
If an AARI manager creates a team with the same name as a team created by any other manager, no error message is displayed and two teams are created with the same name.	
When you access AARI through the web interface, the task and case list pages do not display the following words in the localized languages: • Search task • Results • Request title	

Known limitations

In the process editor page, the following words are not displayed in the localized languages:

- Process entry
- Run
- Undo
- Redo
- Data privacy tag
- Auto assign this task to
- InitialData
- Update request title (optional)
- Update task name (optional)
- Boolean condition

Discovery Bot

New features

Column headers updated in Recordings page

The Recordings page now displays labeled column headers when you review captured steps for recordings. The following headers are displayed for the associated text field:

- Screenshot
- Application
- Data
- Step description

[Record a Discovery Bot business process](#) on page 968

Highlight where you click or enter data when recording processes

The system now displays the area, component, or control where you click or enter data with a red highlighted box at the time of recording.



Note: The red highlight is only shown in the captured screenshot in the generated bot. The highlight is not shown on captured screenshots from the Recordings page for review and after submission to the analyst. The highlight is also not shown from the preview pane from the Aggregated and Opportunity tabs for the analyst review.

[Supported applications and browsers for Discovery Bot](#) on page 967

Condition and value displayed for each branch in Aggregated view

For the System generated view, the condition and its value for each branch are automatically retrieved and displayed as part of the auto-generated Aggregated view.

System-generated aggregation

You can now merge multiple recordings into a single aggregated view automatically by selecting the required set of recordings.

[Create a process view with branches and opportunities](#) on page 976

New features

Convert system-generated aggregated view to a manual view

You can now convert a system-generated aggregated view to a manual view using the Save as [manual] option or the Convert to Manual option from the Views table. This option enables you to add more recordings or steps from other recordings to your process view.

[Create a process view with branches and opportunities](#) on page 976

Create an opportunity, including all steps and branches

You can now use the Select all steps option to create an opportunity that includes all steps, branches, and sub-branches.

[Create a process view with branches and opportunities](#) on page 976

Download a process definition document (PDD) (previously, Export to Word)

The Export to Word option is now renamed as Download Process Definition Document (PDD). When an opportunity is created, the PDD begins processing in the background automatically. When the PDD is ready for download from the Enterprise Control Room, an email notification is sent to the email address on file to the opportunity owner.



Note: You must be the owner of the opportunity to be able to download the PDD.

[Review opportunities and convert to bot](#) on page 983

Receive email notification when your bot is converted successfully

You can now receive an email notification when your bot is successfully converted. Click the hyperlink in the email to take you to your folder in which the bot was generated.

[Review opportunities and convert to bot](#) on page 983

Changed features

Zoomed-in view of captured steps is increased

The zoomed-in view in the Screenshot field is now increased from x4 to x8 for better readability of captured steps.

Permissions layout

The layout of the permissions for Discovery Bot is now changed to separate the individual and "all" permissions to easily manage access control.

Fixed features	
Service Cloud case ID	Description
--	When you create a branch in a view, typically a single step from the current branch is moved into the left branch while a new branch with an empty box is added to the right branch. You can add steps from a different recording only into the empty box in the right branch. Typically, only one step from the original branch is included in the left branch. If the branch is created following the last step in the flow, then no steps will be included in the left branch. You can now add new steps to the left branch in case it was the last step. You can also move the endpoint of the newly created branch lower or higher in the process to include additional steps in the left branch.

Known limitations
In the Opportunities tab, the process and owner column does not allow you to sort in ascending or descending order, or when you sort for both process and owner.
In the Opportunities tab, the search field and the filter drop-down option do not work when you search for the Process or Owner columns.
The Download PDD option is disabled if you are not the owner of the opportunity.
The Delete icon is not properly visible in the edit recordings screen in Internet Explorer. Two-finger swipe on the track pad does not change the zoom level in any canvas of the Aggregated and Comparison tabs.
Discovery Bot is currently not supported on Linux.
The red highlight is only shown in the captured screenshot in the generated bot. The red highlight is not shown on captured screenshots from the Recordings page for review and after submission to the analyst. The highlight is also not shown from the preview pane from the Aggregated and Opportunity tabs for analyst review.

IQ Bot

New features
Support for Arabic language When creating a learning instance, you can now choose the Arabic language from the Primary language of documents drop-down menu, with the following limitations: • Advance table extraction is not available. • Search field on the Validator is not supported. • Arabic numerals are not supported. For example, if the document has date or time in Arabic language, it is extracted as text and validations can fail.  Note: You can still use string-based validation checks (such as regular expressions) for Arabic numerals. • Arabic is only supported on ABBYY FineReader Engine 12.4. Creating a learning instance
Default validations for a group When editing a learning instance, you can now use the Select the default validations group drop-down menu to select an available group. This allows all the new group documents in production to be extracted based on the custom logic and validations defined in this selected group, before it goes to the Validator. Edit a learning instance
Changed features
Automatically detect check box IQ Bot can now automatically detect check boxes and radio buttons in a document. You can enable this feature when creating a learning instance. Creating a learning instance • With this feature enabled, during training, if you select check box from the data type drop-down list and then you select the field value, only the check box segments are displayed. • This feature does not work with the PDFBox option enabled. Disable PDFBox option

Changed features	
Tegaki API OCR improvements IQ Bot now uses enhanced Tegaki API OCR segmentation to improve accuracy in the following scenarios: • Multiple fields are merged into a single SIR • Segmentation on empty spaces • Overlapping SIRs • Incorrectly located SIRs • Partial or incorrectly captured values from SIRs IQ Bot Tegaki API OCR engine	
Updated versions of RabbitMQ and Erlang/OTP The IQ Bot A2019 installation package now includes RabbitMQ version 3.8.8 and Erlang/OTP version 23.0.4. RabbitMQ and Erlang/OTP upgrade	
PyArabic removed from Python installation PyArabic is one of the Python libraries that was used in content extraction for Arabic language (right to left). Because Arabic language is now supported by default with IQ Bot A2019 installation, PyArabic is removed from Python installation. List of Pandas Libraries which are supported and not supported on A2019 IQ Bot (A-People login required)  Note: Ensure you update any bot that you have deployed using PyArabic.	
Performance improvement (Service Cloud case ID: 00629302) IQ Bot now takes significantly less time to create a bot for groups containing only production documents.	

Fixed features	
Service Cloud case ID	Description
00500914	The TesseractLog.log file is now available in the following directory: C:\Users\Public\Public Documents\Automation Anywhere IQBot Platform\Logs\Engine\. The log level is set to error by default. You can change this setting in the CognitiveServiceConfiguration.json file.
00430923, 00618234, 00636422, 00478986, 00414921	All uploaded documents are now rendered correctly, irrespective of their content orientation while uploading, which enables you to train them without encountering any issues. Previously, when you created a learning instance, documents that did not have the correct content orientation (they were upside down or tilted) could not be trained.

Fixed features	
Service Cloud case ID	Description
00653929	IQ Bot A2019 On-Premises: With segmentation improvements, you can now train documents in the Korean language using the Tegaki API OCR engine without any system-identified region (SIR) errors.
--	The system no longer creates any unnecessary folders for successfully classified documents that are uploaded using the IQ Bot [Local Device] package.
--	You can now use the designer page when creating a learning instance to test all the documents, without any error messages.
00590165	For a learning instance, you can now use the See extraction results option to browse all the documents in the selected group.
00672470	After validating the fields of production documents, you can now use the Save current document option to save all the validated document, without any error messages.
--	Check box fields are now extracted with better accuracy. You can use the Checkbox auto-detection feature so that IQ Bot automatically detects the check box fields and radio buttons.
00652269, 00619139	When you now run a bot and try to edit it while it is still running, the following correct message is displayed: <code>Staging Documents for this Vision bot is in progress. Please try after some time.</code> Previously, the following incorrect message was displayed: <code>Learning instance not found.</code>
00601401	When creating a learning instance, you can now use the Thai language for form and field names without encountering any issues.
00624416	When you migrate a learning instance, group descriptions are now migrated without any errors.
--	If you select any field on the Validator screen, the focus from that field is no longer lost when you now click or draw to select SIR.
00662968	Sometimes, when you click See Extraction Results and the preview fails, IQ Bot now correctly displays the following error message after a timeout of 2 minutes: <code>Error occurred while extracting the document. Please re-check the training/document.</code> Previously, when the preview failed, the page kept loading indefinitely.

Known limitations
IQ Bot On-Premises and Cloud In the table area of the Validator, if you add a new row, enter a value, and then delete this row, the value of the next row is replaced by the content you entered in the deleted row.
IQ Bot On-Premises and Cloud In the Validator, when you click any validated field and then click any other cell, the value in the validated field is deleted.
IQ Bot On-Premises and Cloud When you upload a document to production immediately after deleting a bot it was associated with, extraction results are not displayed. Workaround: Use one of the following options: • Select the Disable cache option in the Network tab. • Ensure you wait at least 3 minutes between deleting the bot and uploading the document. • Empty the cache and reload the page.
IQ Bot On-Premises and Cloud You cannot use Express mode to install IQ Bot A2019.
IQ Bot On-Premises and Cloud Numerals in the Polish language are not accepted or validated in the Validator.
IQ Bot On-Premises and Cloud If you create a user role with 2-byte non-English characters, services fail with an <code>invalid characters</code> message.
IQ Bot On-Premises and Cloud If the name of a learning instance has both English and Arabic characters, the time stamp of the backup file is appended in between the filename.
IQ Bot On-Premises and Cloud You cannot use the draw functionality to generate an SIR when you zoom in on a document in the Validator.
IQ Bot On-Premises After installing IQ Bot A2019, MLWeb services stops responding. Workaround: Manually stop and restart the MLWeb services.
IQ Bot On-Premises If you add a new language after upgrading to IQ Bot A2019, the Learning Instance page is not displayed due to Language API cache issues. Workaround: Clear the cache and restart the IQ Bot service.
IQ Bot On-Premises and Cloud If you try to process a PDF document with pdfboxOCR enabled, the SIRs are not placed correctly on the check boxes. Workaround: Disable the pdfbox OCR when you create a learning instance.

Known limitations
IQ Bot On-Premises and Cloud If you create a learning instance with Auto Checkbox Detection enabled, check box SIRs cannot be selected. Workaround: Draw on top of the check box SIR instead of selecting the identified SIR field.
IQ Bot On-Premises and Cloud Starting with IQ Bot A2019.17, the default OCR engine is changed to ABBYY FineReader Engine 12.4 from the previous 12.2 version. Therefore, if you have migrated learning instances from earlier versions, you might have to retrain your bots because there could be a change in segmentation.

Bot Insight

New features
New AARI dashboard in Bot Insight Use the AARI dashboard to view various widgets that provide information about requests created from published processes in AARI. The dashboard also provides statistics on the status of created requests. AARI dashboard on page 1324

Security fixes	
Service Cloud case ID	Description
--	The Allow Header HTTP header is removed from Bot Insight.

Supported packages

Package	Version
Application	2.1.0-20200921-085720
App Integration	1.1.0-20201014-042506
Analyze	2.2.4-20200903-113949
Active Directory	2.1.0-20200921-085716
Boolean	2.1.0-20201014-042509
Bot Migration	2.5.0-20200902-045043
Browser	2.1.0-20201002-123733
Clipboard	2.1.0-20201014-042520
Comment	2.2.0-20201014-042520
CSV/TXT	2.3.0-20201014-082525

Package	Version
Database	2.2.0-20201013-052941
Data Table	2.3.0-20201030-143334
Datetime	2.2.0-20201014-042531
Delay	2.2.0-20201014-042532
Dictionary	3.2.0-20201014-042532
Run DLL	3.2.0-20201105-205159
Email	3.1.0-20201104-062204
Error handler	2.2.0-20201014-042541
Excel basic	2.3.0-20201027-160012
Excel advanced	5.1.0-20201027-155758
File	3.1.0-20201016-065515
File & folders	1.1.0-20201023-202725
Folder	3.0.0-20201016-065517
FTP / SFTP	2.1.0-20200921-085757
IF/ELSE	2.1.0-20200921-085758
Image Recognition	2.1.0-20201014-042552
Interactive forms	2.17.3-20201102-103733
IQ Bot	2.1.0-20201013-095304
JavaScript	2.3.0-20201104-062431
Simulate keystrokes	2.4.0-20201021-163833
Legacy Automation	3.2.0-20201104-062439 1.3.0-20201105-151906
List	2.2.0-20201014-042806
Log To File	2.2.0-20201014-042806
Loop	2.1.0-20201014-042808
Message Box	2.1.0-20201014-042808
Migration	2.7.0-20201106-072418
Mouse	2.1.0-20201014-042814
Number	2.1.0-20201014-042823
OCR	2.2.0-20201104-062503
Office 365 Excel	2.2.0-20201104-062559
Office 365 Calendar	2.1.0-20200921-085726
Office 365 OneDrive	2.1.0-20201014-042924
PDF	2.5.0-20201014-042929

Package	Version
PGP	2.2.0-20201014-042931
Ping	2.1.0-20201014-042932
Printer	2.1.0-20200921-090131
Play Sound	2.1.0-20200921-090123
Prompt	2.1.0-20200918-081201
Python Script	2.3.0-20201105-204912
Recorder	2.0.9-20201105-164103
REST Web Service	3.1.0-20200928-231420
SAP	2.2.0-20200921-090209
Screen	2.1.0-20201014-043037
SNMP	2.1.0-20201014-043041
Service	3.0.0-20200921-090214
SOAP Web Service	3.1.0-20200921-090219
String	3.1.0-20201014-043052
System	3.0.0-20200921-090225
Task	2.0.1-20201023-202703
Terminal Emulator	3.4.0-20201028-021451
Trigger Email	1.1.0-20201105-152220
VBScript	2.3.0-20201105-205228
Wait	3.1.0-20201014-043117
Window	2.2.0-20201022-121649
Workload	2.3.0-20201105-205233
XML	2.1.0-20201014-043121

Related reference

[Community Edition A2019.17 Release Notes](#) on page 204

Enterprise A2019.16 Release Notes

Release date: 28 September 2020

Review the new features, supported packages, changed features, fixed features, security fixes, and known limitations in the Enterprise A2019.16 (Build 6463) release. IQ Bot is on Build 6443.



Important: We have updated Enterprise A2019.16 to Build 6463 to include fixes for issues with checking in and checking out bots (Service Cloud case ID 00666880, 00670899, 00672441, 00670455, 00672346), and Universal Recorder (Service Cloud case ID 00664020). See the [Fixed features](#) section for more information.

- [Enterprise A2019](#) on page 72

- [Discovery Bot](#) on page 88
- [IQ Bot A2019](#) on page 92
- [Bot Insight](#) on page 93
- [Automation Anywhere Robotic Interface \(AARI\)](#) on page 94

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features

Migration to A2019 ([currently available only to customers in the Migration Early Adopter Program](#))

Enterprise A2019

Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program or a timeline for when migration will be available to all customers, contact your Automation Anywhere representative.

- 11.x only
 - Migrate audit logs to Enterprise A2019.
[Migrate 11.x audit logs](#) on page 437
 - Migrate bots that contain disabled commands that have validation errors.
 - Migrate bots that contain Delete, Delete All Messages, and Get All Messages commands to automate an email-related task on Exchange Web Services (EWS).
- 10.x only

Migrate user credentials to the Enterprise A2019 Credential Vault.
[How 10.x data is copied to Enterprise A2019](#) on page 444
- 11.x and 10.x
 - Migrate bots that contain the Variable Operation command, which re-initializes the row and column index of an array variable using a variable.
 - Migrate bots that run MetaBot Logic and return the values to a dictionary variable.
 - Migrate MetaBots that contain DLLs that use lists, values, arrays, and two-dimensional arrays as input and output.
[How MetaBots are migrated](#) on page 498
 - Migrate bots that contain Send Email with Attach Variable option from the Error Handling command to the A2019 Error handler package.
[Package mapping for migration](#) on page 453
 - Migrate bots that contain the Image and Coordinates play modes from the Object Cloning command to the Recorder package in Enterprise A2019.
[Package mapping for migration](#) on page 453
 - Migrate bots that contain credential variables in select commands such as Active Directory, Excel, REST Web Service, and Terminal Emulator to Enterprise A2019.
For the complete list of commands, see [Variable mapping for migration](#) on page 482.

Support for using CSV and TXT files as databases

Enterprise A2019 and Community Edition

Use the actions from the Database package to connect with and perform create, read, and update operations on the file.

[Using Connect action for database](#) on page 559 | [Database package](#) on page 557

Universal Recorder support for standard Microsoft controls in Microsoft Silverlight

Enterprise A2019 and Community Edition

The Universal Recorder can now capture calendars, buttons, check boxes, combo boxes, date pickers, labels, links, list views, radio buttons, sliders, tabs, tables, text boxes, and trees from applications running Microsoft Silverlight version 5.

New features
Use variable to specify a child bot to run Enterprise A2019 Use the Enterprise Control Room path in the Run action of the Task Bot package to use a string variable to specify the child bot you want to run. Task Bot package on page 804
Install Bot agent in bulk using registration key (Service Cloud case ID: 00616591) Enterprise A2019 As an Enterprise Control Room administrator, you can generate a registration key from the Enterprise Control Room settings to install Bot agent in bulk on multiple devices. You can use the registration key in an installation script or as part of the Active Directory group policy for configuring the Enterprise Control Room users. Generate registration key to install Bot agent in bulk on page 1144
Automatically detect proxy settings for Bot agent installation to support NTLM authentication (Service Cloud case ID: 00446932, 00639773) Enterprise A2019 and Community Edition The proxy settings for a Bot agent are automatically detected if the Automatically detect settings option is selected in the LAN settings for a System user and Current user on the machine where the Bot agent is installed. This allows Enterprise Control Room users to be authenticated using NTLM.
Restrict network access to Cloud Control Room URL Enterprise A2019 System administrators can restrict access to the Cloud Control Room URL from only those IP addresses within the corporate network for more granular security. The Automation Anywhere Enterprise Control Room provides the ability to specify a list of IP addresses or IP subnets that are allowed for Cloud Control Room URL and API access. A2019 users with Control Room administrator privileges, such as to access Administration > Settings, can view, add, or edit this list. Add access IP addresses on page 1136
Add Elasticsearch credentials for enhanced monitoring and alerting Enterprise A2019 An option to provide Elasticsearch credentials is now available in the Enterprise A2019 installer because the updated Elasticsearch version 7.8 configured for Enterprise Control Room uses Open Distro version 1.9.0. This feature enables the server to deploy an enhanced monitoring and alerting system. Add Elasticsearch credentials on page 337
Support for Chinese, Japanese, and Korean characters in variable names Enterprise A2019 and Community Edition You can now create variables with names containing Chinese, Japanese, or Korean characters. You can also migrate bots that contain variables named using these characters. Unicode range supported in variables on page 876

New features
Support for Chinese language for Terminal Emulator (Service Cloud case ID: 00500324) Enterprise A2019 You can now use the simplified and traditional Chinese language with 5250E terminal DBCS models such as IBM 5555-C01 and IBM 5555-B01.
New Services package available Enterprise A2019 and Community Edition Use the new Services package to automate operations and application services. You can start, stop, pause, resume, or to get the status of a Windows or application service. Service package on page 780
Enhancements to the Excel advanced package Enterprise A2019 and Community Edition In the Excel advanced package, you can now use Read value from a cell. You can choose the Read option to read either visible text or the value from the cell. The default option is set to Read visible text in cell. For example, if the cell has \$50 as the value, then the Read cell value option reads the value as 50, ignoring the currency format. The Read visible text option reads the content along with currency format as \$50. This option is available for the following actions: • Get single cell • Get multiple cells • Read row • Read column • Get worksheet as datatable • Loop Cell operations on page 616 Row and column operations on page 613 Loop package on page 687
Automate a task on a range of cells in an Excel worksheet (Service Cloud case ID: 00651299) Enterprise A2019 and Community Edition In the Excel advanced package, you can perform operations on the range of cells for Go to cell and Set Cell actions. Cell operations on page 616
New condition in the If and Loop packages Enterprise A2019 and Community Edition Use the Service is running or Service is not running condition to execute actions based on whether a particular service is running or not. For example, when you send a mail using this condition, the bot can verify if the SMTP service is running or not. If package on page 656 Loop package on page 687

New features
Capture hidden objects using AISense Recorder Enterprise A2019 Use AISense Recorder to capture hidden image buttons on the application screen. Edit a task recorded using AISense on page 849
New operations on SAP captured objects Enterprise A2019 Use new options that are available to perform operations such as Set Focus and Select item by key for the various objects captured from an SAP application.
Pass parameters of various types to a DLL function Enterprise A2019 Use the new Run function action to pass parameters of various types to a DLL function. The Run function that was available in earlier versions is now renamed to Run function (Legacy) and enables you to pass only dictionary variable as parameter to a DLL function. Using the Run function action on page 582 Using the Run function (Legacy) action on page 581
Form builder updates Enterprise A2019 The form builder now includes the following new elements: • Rich text editor- Enables you to add a customizable element to the form. • Table- Enables you to add tables to a form. Create a form on page 931
Enhancements to the form preview Enterprise A2019 When you click the Preview option in the form builder screen, you can drag the form. The corresponding X and Y coordinates are updated automatically.
Enhancement to the Snapshot element Enterprise A2019 You can now create a folder if the filepath is not available or change the destination folder of the snapshot file during bot runtime. Using the Snapshot element on page 940
Update to the Interactive forms package Enterprise A2019 Use the Validate form action to validate all the elements of a selected form. Interactive forms package on page 665

New features
New permission to view basic information about users and roles (Service Cloud case ID: 00491694) Enterprise A2019 The View Users and Roles basic information permission enables you to view basic information about other users and roles such as the username, first name, and last name. After you upgrade from an earlier version to this release, this permission is granted to all existing roles.
Securely pass values in header and parameters of calls to a REST or SOAP web service Enterprise A2019 and Community Edition Credential variables enable users to retrieve sensitive values from the Credential Vault and pass them to the web service. Use credential variables in the header or parameter fields of actions from the REST Web Service or SOAP Web Service package. Credentials and credential variables in the Bot editor on page 878 REST Web Service package on page 760 SOAP Web Service package on page 793
Return system parameters of the device on which a bot is running Enterprise A2019 and Community Edition Use the Get environment variable action from the System package to return the system parameters, including HomePath, ProgramData, ProgramFiles, SystemRoot, and UserDomain. Environment variables for System package on page 801
Remove Git integration configuration (Service Cloud case ID: 00633948) Enterprise A2019 You can now remove or disable a Git integration configuration from your Enterprise Control Room when the bot information stored in your Enterprise Control Room does not have to be synchronized with the remote Git host. Remove Git integration configuration on page 1140
Expanded data type support in DLL package Enterprise A2019 and Community Edition The DLL package now accepts table variables as input parameters or to hold action output. Using the Run function (Legacy) action on page 581
Create variable within Dictionary > Assign and List > Assign actions Enterprise A2019 and Community Edition The Assign action from the Dictionary and List packages now offers users the option to create a new variable within the Select source variable field. Previously, users could only select a variable from a list of existing variables.
New API for license management Enterprise A2019 The License API contains endpoints to retrieve Enterprise Control Room license details (such as the expiration date and license mode) and to update the Enterprise Control Room after license reallocation or renewals. License API on page 1221

New features
New expression in the Legacy Automation package Enterprise A2019 The List to table expression supports migrated bots containing a variable that has to be converted from a list type to a table type. Legacy Automation package on page 681
Multi-user device sessions on terminal servers Enterprise A2019 Multi-user device sessions are now supported on terminal servers. You can perform the following actions: • Set screen resolution at either the device or Enterprise Control Room level. • Set a multi-user device as the default device for Bot Creator users and attended and unattended Bot Runner users. • As a licensed user (with a default device), set another device as your default device using the Make default device option from the device menu. • View and edit the device settings on the device landing page. The device landing page shows additional information about the user-provided device name (device nickname), device type, and the default user. • Convert an existing device to a multi-user device in order to share the same device between Bot Runner and Bot Creator users who can then coexist in different sessions simultaneously. (Service Cloud case ID: 00624046) About multi-user devices on page 1070 Convert an existing device to a multi-user device on page 1072 Configure RDP-based deployment for multi-user devices on page 1071

Supported packages	
Package	Version
Node Manager	14.1.7079
Application	2.1.0-20200819-064505
App Integration	1.1.0-20200825-070948
Analyze	2.2.4-20200903-113949
Active Directory	2.1.0-20200825-070945
Boolean	2.1.0-20200831-031000
Bot Migration	2.5.0-20200902-045043
Browser	2.1.0-20200825-071008
Clipboard	2.1.0-20200831-031014
Comment	2.1.0-20200831-031015
CSV/TXT	2.3.0-20200825-071131
Database	2.1.0-20200913-060112
Data Table	2.1.0-20200831-031946

Supported packages	
Package	Version
Datetime	2.2.0-20200831-031025
Delay	2.2.0-20200831-031026
Dictionary	3.2.0-20200831-031027
Run DLL	3.0.0-20200831-110441
Email	3.0.0-20200901-105426
Error handler	2.1.0-20200831-031055
Excel basic	2.1.0-20200831-031843
Excel advanced	5.0.0-20200909-124042
File	2.2.0-20200831-031057
File & folders	1.1.0-20200907-073046
Folder	2.2.0-20200831-031100
FTP / SFTP	2.1.0-20200825-071155
IF/ELSE	2.1.0-20200825-071156
Image Recognition	2.1.0-20200825-071159
Interactive forms	2.16.0-20200914-151814
IQ Bot	2.1.0-20200901-105449
JavaScript	2.1.0-20200831-031525
Simulate keystrokes	2.3.0-20200901-093759
Legacy Automation	3.1.0-20200831-031532
	1.1.0-20200825-071342
List	2.2.0-20200831-031539
Log To File	2.2.0-20200831-031539
Loop	2.1.0-20200831-031540
Message Box	2.1.0-20200831-031541
Migration	2.5.0-20200902-045043
Mouse	2.1.0-20200831-031542
Number	2.1.0-20200831-031551
OCR	2.2.0-20200825-071359
Office 365 Excel	2.1.0-20200825-071452
Office 365 Calendar	2.1.0-20200825-071013
Office 365 OneDrive	2.1.0-20200825-071459
PDF	2.5.0-20200831-031836
PGP	2.2.0-20200831-031838

Supported packages	
Package	Version
Ping	2.1.0-20200831-031839
Printer	2.1.0-20200825-071516
Play Sound	2.1.0-20200825-071509
Prompt	2.1.0-20200824-092056
Python Script	2.1.0-20200831-031850
Recorder	2.0.8-20201009-015051
REST Web Service	3.1.0-20200824-092129
SAP	2.2.0-20200825-071614
Screen	2.1.0-20200825-071618
SNMP	2.1.0-20200825-071620
Service	3.0.0-20200821-060952
SOAP Web Service	3.1.0-20200827-210959
String	3.1.0-20200831-031943
System	3.0.0-20200831-031944
Task	2.0.1-20200907-072949
Terminal Emulator	3.3.0-20200831-031950
Trigger Email	1.1.0-20200903-114514
VBScript	2.1.0-20200831-031953
Wait	3.1.0-20200831-031955
Window	2.1.0-20200813-181240
Workload	2.1.0-20200825-071644
XML	2.1.0-20200831-031958

Changed features
Enhanced Capture area action in OCR package The Capture area action now captures text from the visible area of the screen even if the target area is below the visible screen. Previously, the bot showed an error when the captured area was below the visible screen. Using Capture area action on page 703
Bot Scanner update The Bot Scanner now displays error messages for bots that cannot be migrated to Enterprise A2019 in the summary report. Analyze reports on page 449

Changed features
Flow view update A line number is now displayed for each action in the Flow view of the Bot editor.
CSV/TXT package update The Enterprise A2019 CSV/TXT package processes a space as character. For example, if your CSV or text file includes January, "March, April", then the output is displayed in the following format: January "March (space before the double quotation mark) April" If the CSV or text file contains the same information but without a space between January and March (for example, January, "March, April"), then the output is displayed in the following format: January March, April
Upgrade for resilient bot deployment After you upgrade the Enterprise Control Room and Bot agent to Enterprise A2019.16, scheduled and queued bots are not terminated. This is part of the resiliency improvements where the Enterprise Control Room and Bot agent are set in a consistent state. As a result, the device reconnects to the Enterprise Control Room if there are any network disruptions, and scheduled and queued bots are deployed.  Important: During the upgrade to Enterprise A2019.16, all bots that are running will be terminated. After the upgrade, if the system is in an inconsistent state, restart the Bot agent so that the system is in a consistent state.
Internet Explorer waits for completion before initiating Recorder action When you use the Recorder package, the bot now waits for the Internet Explorer browser to finish loading the page before executing any action. This enhances the reliability of the bot by preventing it from failing while the page is loading. For example, the Recorder does not try to search the object before the web page is fully loaded. Using the Capture action on page 758
High availability enhancement Starting from this release, configure the required minimum three Enterprise Control Room nodes in an Enterprise A2019 data center cluster for high availability deployment. High availability deployment on page 322

The following table lists the fixed features and the builds in which they were fixed (Build 6463 is the latest build, and Build 6453, and Build 6448 are previous builds). The fixes are cumulatively available in the latest build.

Fixed features		
Build number	Service Cloud case ID	Description
6463	00644915	The Bot agent that uses a self-signed Certificate Authority (CA) for SSL authentication is now updated automatically when you upgrade from an earlier release to this release.
6463	00666880, 00670899, 00672441, 00670455, 00672346	Bot files or dependencies are no longer lost when you check in or check out a bot from the private or public workspace. Previously, an error occurred while either checking in or checking out a bot, and the bot files or dependencies were lost and could not be recovered.
6463	00664020	You can now successfully run a bot that contains the Capture action from the Recorder package with both the <code>HTML</code> <code>InnerText</code> and <code>InnerHTML</code> object properties selected.
6463	--	Fixed an issue where the Universal Recorder failed to perform a click, set text, or append text action on the correct control in Google Chrome when a debug window or download bar was open.
6453	00669040, 00669164, 00668923, 669332, 00669473, 00671509, 00669178	The Automation Anywhere Elastic Search Service now restarts during the certificate retrieval process when you upgrade from Enterprise A2019.15 to Enterprise A2019.16. However, if you encounter any issues with the Automation Anywhere Elastic Search Service during the restart, see Elasticsearch Service fails to start during certificate retrieval process error during A2019.16 upgrade (A-People login required) .
6448	00573048	You can now preview table variables in debug mode and validate the bot logic. Previously, watch variables containing Japanese and Chinese characters did not display values in the table variable.
6448	00656475	The Bot Deploy API call now consecutively executes all the runAs users that are set in the runAsUserIds parameter.
6448	00569832, 00628474, 00656267	The device registration issue due to Bot agent version extraction is now fixed. The exception of "for input string null" no longer occurs.

Fixed features		
Build number	Service Cloud case ID	Description
6448	00609073	You can now successfully integrate your Enterprise Control Room with your remote Git repository without any error. Previously, the Git integration failed because of a 404 error.
6448	00632444, 00626829, 00667531	When you import a main task containing subtasks using the overwrite option, the dependent subtask references are no longer deleted for other existing main tasks that use the same subtasks. As a result, the execution of other main tasks containing the same dependent subtasks does not fail.
6448	00501208, 00572346	For the Create user event name, the audit log now properly displays the username who created that user in the Event Started By column. Previously, the same column did not display any value.
6448	00616202, 00637626, 00653919, 00664039, 00664744	When the debug log is enabled in logs configuration and you use the For each row in a SQL query dataset option from the Loop action to iterate each row, the iteration now completes without any error. Previously, the iteration failed because of a change in the debug log configuration.
6448	00653064	After the caching service is restarted, the bot execution no longer fails. The caching client instances are reconnected and reinitialized after the restart.
6448	00577612	In a bot with dependencies, if you check out and edit a child bot in your private workspace and later check out the parent bot, you will no longer lose the changes made to the checked-out child bot. Previously, changes made to the child bot were overwritten.
6448	00623154	When a Bot Creator that does not have create folder permission tries to check in a bot to the public workspace, an appropriate error message is now recorded in the audit log, indicating the specific reason for the failure. Previously, the audit log recorded an unexpected error occurred message.
6448	00622977	In the Edit role page, file permissions are now correctly aligned in Internet Explorer. Previously, the Delete from Public option was displayed below the Select all option. As a result, the folder and permissions were not placed next to each other.

Fixed features		
Build number	Service Cloud case ID	Description
6448	00615437	You can now migrate MetaBots that contain input and output type variables with a description containing unsupported characters such as quotation marks (") and forward slash (/).
6448	00636169	The Enterprise Control Room now disables a user account when the number of consecutive failed login attempts specified in the Enterprise Control Room settings is reached or exceeded.
6448	00530550	A variable now returns the correct value when the regional setting of the device is set to the Brazilian metric system.
6448	00604893	A bot no longer encounters an error when the system cannot finish pre-processing the bot due to an ignite cache issue.
6448	00578277	An error is no longer encountered when the Connect and Disconnect actions of the SAP package are used in a loop and the iteration is set to more than 500 times.
6448	00635890	The Bot Scanner now scans all the bots in a repository and displays the correct count of child bots.
6448	00634238	You can now use the form builder in Internet Explorer (version 11 or later) to add more items to the Checkbox and Radio Button elements without encountering any issues.
6448	--	For the Select file element, you can now upload a file with a dot (.) in the filename. For example, Sales.March.jpg.
6448	--	Software version notification for Cloud was not always displayed in the UI. This issue is now fixed.
6448	00633793	You can run a bot when the operational parameter is used in the SOAP Web Service action. Previously, the bot encountered errors when the operational parameter was used in the action and the corresponding wsdl file did not have the <code>elementFormDefault</code> attribute.
6448	00630975	Captured images in a nested If action are now retained when you check in a bot to the public repository. Previously, when using any action that used an image in a nested If action, the image nested was missing after the check-in.

Fixed features		
Build number	Service Cloud case ID	Description
6448	00630004	When loop is used to read all Unread emails, the emails are now marked as Read only after emails are read. Previously, all unread emails were marked as read when a Loop Break action was used.
6448	00612913	In Excel Advanced > Remove blank rows, when you select the Specific row option and set A1 as the beginning cell, an error is no longer encountered when you run the bot.
6448	00608265	In the CSV/TXT package, when you use Japanese OS ANSI (Shift-JIS) as encoding to read text file content, the Japanese Shift-JIS characters are now displayed correctly.
6448	00568718	Japanese language supported pop-up messages no longer appear truncated when multiple bots are deleted.
6448	00598023, 00611480	In the DLL package, Run function now works properly and does not display an error or show broken characters when the parameter includes Japanese characters.
6448	00638120	When you upgrade from an earlier version of Enterprise A2019 to a later version and change the If package version to the latest one, multiple conditions now appear in If/Else If after the If package is upgraded. Previously, some of the conditions did not show in the logic.
6448	00632228, 00649606	You can now use the Send Email action when the package version is different in the task and subtask. Previously, the Send Email action in the Email package had issues when the task and subtask had a different package version.
6448	00544219, 00635206	The Get cell action in Excel Advanced can now be used without any error. You can use the Read option to read visible data or the exact value of the cell.
6448	00646254, 00650712, 00653137, 00658122, 00666883	You can now change the package version of the If package. Previously, if there were multiple conditions in the If action, the system did not allow you to change the package version.

Fixed features		
Build number	Service Cloud case ID	Description
6448	00613453	Version 11.3 bots that used the Object Cloning command to find interface objects using coordinates or image recognition are now migrated to Enterprise A2019 with the Mouse > Click action, Simulate keystrokes action, OCR > Capture area action, or Image recognition > Find window in window action.
6448	--	When you run migrated bots that perform mathematical operations on values containing decimals or commas, the output from Enterprise A2019 now matches the output from Version 11.3.5. Previously, an operation that resulted in an output of 0.999 in Version 11.3 resulted in an output of 0.9899999 in Enterprise A2019.
6448	00467664	Fixed an issue where the Universal Recorder entered characters in a text box incorrectly when the user configured the Keystrokes field using a Japanese keyboard.
6448	00630545, 00631418, 00621875	You can now assign input values from a parent bot in the Task Bot > Run action. Previously, an issue caused input values to disappear when a bot containing more than two input values was saved.
6448	--	The Workload In progress activity page now displays the Workload bot name instead of the automation name.
6448	00635306	Fixed an issue where a red error screen appeared if a bot attempted to pass a file variable to another bot.
6448	00635326	You can now run bots built using Recorder package versions from earlier builds.
6448	00616261	You can now pass credential values to the main bot when you deploy it from the Run bot now page.
6448	00647135, 00647652, 00647665, 00647144, 00648742, 00646535, 00648883, 00648980, 00654937, 00657039, 00664049, 00663797, 00664138, 00667384	When you upgrade to the latest version of Enterprise A2019, bots in queued state now run without any issues because a new token is automatically generated when an existing session expires.
6448	00611109	Fixed an issue where the \$\$System:CPUUsage \$ system variable returned an inaccurate value.

Fixed features		
Build number	Service Cloud case ID	Description
6448	00647239	In the Data Table package, when you use the Merge action to merge two data tables, the data is now properly merged and the merged content stores the correct data in the result data table. Previously, the Merge action had issues when no header data in a table was extracted, resulting in incorrect data export to CSV file.
6448	00444907, 00556374, 00582469, 00628801, 00624681, 00632668	A bot launcher error for a user session is no longer displayed when you run a bot on a Bot agent device registered to a user who is assigned developer privileges.

Security fixes	
Service Cloud case ID	Description
00552076	The vulnerabilities found in Elasticsearch in Enterprise A2019 are now addressed.
00631233	In the Database package, when you connect to the database, the username and password are no longer visible in the logs.

Known limitations
When you are upgrading from an earlier version of Enterprise A2019 to the current version, the system displays the error message <code>Self Sign Certificate Failure</code>, and the installation process is rolled back if both the following conditions occur: 1. The earlier version was installed on a non-default installation path instead of the default path (C:\Program Files\Automation Anywhere\Enterprise). For example, the previous version was installed on D:\Program Files\Automation Anywhere\Enterprise. 2. You also select Yes to retain the current installation parameters during upgrade in the message window that appears after the Welcome screen when the installation wizard detects an earlier version. Workaround: Select No so that you can choose to enter the installation parameters during the upgrade. Control Room upgrade fails with self signed certificate failure error (A-People login required)
Service Cloud case ID: 00672719, 00673048 When you are upgrading the Enterprise Control Room to the current version, the installer uses an existing or creates a new Elasticsearch data folder in the default path (C:\ProgramData\AutomationAnywhere\elasticsearch\data) if the Elasticsearch data from the earlier version is saved to a non-default path. Therefore, the earlier Elasticsearch data and audit logs will not be available after the upgrade. Workaround: Before upgrading to the current version, copy the existing Elasticsearch data from the non-default path to the default path.

Known limitations
When an Automation Anywhere package is manually uploaded using the Enterprise Control Room interface, the Vendor column should show Automation Anywhere. Instead, the interface displays Unspecified . Automation Anywhere packages that are installed on a server as a part of an upgrade show the Vendor as Automation Anywhere, which is expected.
For existing device sessions, you cannot use the option to enforce the resolution set at either the device or Enterprise Control Room level. The screen resolution set at these levels only work for new device sessions.
When attended and unattended Bot Runners are run concurrently, attended Bot Runner users are queued until the unattended Bot Runner session becomes available. This occurs even when the number of allowed concurrent sessions is not exceeded. For an attended Bot Runner user deployment, use a single user session to stop them from being queued.
When a user connects to a multi-user device and sets it as their default device, they are taken through the device registration wizard to enable the Google Chrome plug-in. During the registration process, users are allowed to select the device type and the concurrent sessions value. Users must ensure that they set the same value for the concurrent sessions as set by the administrator. If there is a difference in the value, other users will be impacted.
When a bot is deployed through RDP with a predefined screen resolution, the RDP resolution settings are not applied correctly during bot execution. The bot is executed with an interchanged resolution (the height and width pixels are interchanged). For example, if the resolution for bot deployment is set as 1366x768, the bot is deployed with the resolution 768x1366. Workaround: For information about how to resolve this issue, see RDP based deployment does not run bot with pre-defined set screen resolution (A-People login required) .
The element label or text appears distorted during bot runtime when you add it in Japanese or any other non-English language, and the Font name is set to System default.
Service Cloud case ID: 00667210 In Excel advanced, you cannot use the Go to cell action if the Excel sheet does not have data or if an active cell is out of the worksheet range. This issue is encountered when you use the Go to cell action and choose the cell option as Active cell with the Beginning of the row, End of the row, Beginning of the column or End of the column option. Workaround: Use the earlier version of the Excel advanced package 4.0.0-20200723-234413 released with Enterprise A2019.15.
HTTP authenticated proxy is not supported for On-Premises users.

Discovery Bot

New features
Discovery Bot installer integrated with Enterprise A2019 installer Enterprise A2019 The Discovery Bot installer is now integrated with the Enterprise A2019 installer. No separate installation is required for Discovery Bot On-Premises users. Discovery Bot supports custom installation for Windows. Prerequisites for Discovery Bot on page 954

New features	
Create multi-role users Enterprise A2019 Combine up to three Discovery Bot system-generated roles and two process discovery licenses to provide additional functionality for your users. Create multi-role users for Discovery Bot on page 960	
Create custom role user Enterprise A2019 Create a unique custom role using the permissions from the Discovery Bot standard user roles (Admin, Business user, or Analyst roles). Create a custom role for Discovery Bot on page 962	
Manual aggregated view integrated with Dashboard tab Enterprise A2019 The Manual aggregated view is now integrated with the Dashboard tab. You can now select and display recordings and views from the Dashboard, Aggregated, and Comparison tabs, enabling you to make a change in one tab that will persist across all tabs. This feature enables a synchronized representation of your metadata for views and recordings.	
Internalization, localization, and language support for Discovery Bot Enterprise A2019 Internalization and localization is now supported for Discovery Bot. For example, you can automate and translate the UI for your region in French, Spanish, and Italian, among other languages supported. Internationalization, localization, and language support on page 309	

Fixed features	
Service Cloud case ID	Description
--	You can now sort on the recording ID. The recent recording (ID) created now displays at the beginning of the list in the Recordings table.
--	When editing the aggregated view, you can now move the endpoint upward in the path flow to change the selection of the steps. You can also move the branch endpoint lower in the path flow to include more than one step.
--	You can now select partial steps in a branch, and create and save an opportunity from the Opportunities tab.
--	The copy field now displays the correct view information from the view (view ID) that it is copied from.
00673381	If you are using an instance in an AWS special region, you can now view recordings for users that are successfully completed (not canceled by the user).

Known limitations
When manually editing an aggregated view, if you create a branch in the process flow where a step was deleted, the step will be missing on the left side of the branch. To add a step on the left side, you can drag the branch endpoint (small circle) down (below the next step) in the process flow to add a step back in the branch. Missing step observed in aggregated view while using A2019.16 Discovery Bot (A-People login required)
When an opportunity is created with 300+ steps, exporting the opportunity to Microsoft Word will fail.
The Convert to Bot option fails when an opportunity contains 140 or more steps.

IQ Bot Community Edition

The IQ Bot Community Edition is available for this release and has feature parity with IQ Bot Version 11.3.4.2.

[IQ Bot A2019 feature comparison matrix](#) on page 234

[IQ Bot A2019 version compatibility](#) on page 238



Important: This new Community Edition includes a preview of IQ Bot with Auto-extraction.

Community Edition for IQ Bot is a special version of our product in the Cloud, available for all users who want to try RPA and IQ Bot at no cost. Users are not required to purchase a license, and there are no time limitations. However, there are some functionality constraints as follows:

- Users can create learning instances using pre-trained Invoices in English only.
- Users can create up to a maximum of 5 learning instances per user account.
- In the Learning Instance list, users can see and access only those learning instances and data created by them.
- Users can process up to a 100 pages per month for each user account.

[Using IQ Bot for intelligent document processing](#) on page 985

New features (using auto-extraction)
Create a learning instance Use a pre-trained invoice (document type) to process and validate your documents in English (only). Create a learning instance in IQ Bot A2019 on page 986
Extract data from documents Create a bot to extract data from documents using the learning instance you created. Extracting information from documents on page 987
Validate documents Validate failed documents manually using the validator form. Validate documents on page 988

New features (using auto-extraction)
Bot Insight integration View learning instance dashboard metrics that is integrated with Bot Insight.
Use the IQ Bot (Preview) package Use the IQ Bot (Preview) package to process and validate documents using Enterprise A2019. IQ Bot (Preview) package on page 667

Changed features
For the Custom Logic feature, the identified list of Python libraries now includes an additional set of safe libraries for IQ Bot A2019 Community Edition. Go to Automation Anywhere support for a list of the safe libraries you can use. List of Pandas Libraries which are supported and not supported on A2019 IQ Bot (A-People login required)

Fixed features (using Auto-extraction)	
Service Cloud case ID	Description
00628958	The Task Bot now successfully processes all documents without displaying any error messages.

Known limitations (using Auto-extraction)
PDF documents with raster format or JBIG2 encoding are not supported. Workaround: Convert such documents to one of the supported formats before processing your documents for data extraction.  Note: Digital PDFs, JPEG, JPG, and PNG are supported formats.
Rotated documents are not supported. Workaround: Pre-process such documents to correct their orientation before data extraction.
Only a predefined set of form and table fields are supported. The table header does not support multiple fields in a single column.
During the validation process, if a user deletes all rows from a table, the user is unable to add a new row. Workaround: Perform these steps: 1. Cancel the validation user form and open the document again. 2. Create a new row before deleting the unwanted rows.

Known limitations (using Auto-extraction)

Documents that are pending review from Enterprise A2019.15 cannot be validated in Enterprise A2019.16 using the Review documents option.

Workaround: Create a Task Bot using the IQ Bot Validation action in the Enterprise A2019.15 package, and validate the review pending documents.

IQ Bot A2019

New features

Updates to IQ Bot Pre-processor package

[IQ Bot A2019 On-Premises and Cloud](#)

You can now perform the following tasks using the new actions in the IQ Bot package:

- Link or combine two images using Concatenate image
- Adjust the size of the selected image file using Edit image
- Enhance the image resolution and other aspects using Enhance image
- Change the image orientation such as angle using Orient image

[IQ Bot Pre-processor package](#) on page 672

[IQ Bot \[Local Device\] package enhancements](#)

The IQ Bot [Local Device] package now enables you to add custom logic (Python scripts) in the Designer to extend text extraction and validation capabilities.

[Add custom logic in IQ Bot to improve extraction](#)

Fixed features

Service Cloud case ID

Description

00590165

You can now train the selected document because error messages are no longer displayed when you click Learning instances > See extractions for a group.

--

If you remove a bot (Delete a bot) associated with a document from the staging environment, you must create a group before uploading this document to the production environment. After deleting the bot from the staging environment, you can now create or edit the group when you upload the same document to the production environment.

00601840

You can now view a public bot without any errors when you click BOTS > My bots > PUBLIC in Enterprise A2019.

00674110

Production documents are now moved to the Validator without any errors, irrespective of how the bot was trained (number pages, number of segments in each page, or number of tables and fields extracted).

00672482

You can now validate documents with a large number of fields (more than 100) and navigate between multiple documents without any issues on the Validator.

Fixed features	
Service Cloud case ID	Description
00648013, 00670191	You can now migrate, export, import, or download IQ Bot learning instance backup (.iqba) files of up to 1.4 GB. The previous limit was 600 MB.

Known limitations	
Migration of learning instances does not get completed if the IQBA file size is more than 2 GB. Workaround: Migration of learning instance is not getting completed if the IQBA is more than 2GB (A-People login required)	
In the IQ Bot Designer, sometimes while training documents when the user clicks See extraction results, an error message appears and the user cannot proceed with the task.	

Bot Insight

New features	
Power BI connector available as part of Microsoft Power BI desktop Enterprise A2019 and Community Edition The Automation Anywhere connector for Bot Insight is now certified and officially a part of the Microsoft Power BI Desktop August release. Data connector for Power BI on page 1337	
Business analytics support for attended Bot Runners Enterprise A2019 and Community Edition Business analytics data is now logged when bots are run with attended Bot Runners licenses. Also, a new attribute User Name is available in the Business Dashboard in Transaction Data. This attribute shows the user who is running the bot.	

Changed features	
Convert bot duration metric to percentage In the Device dashboard, when you select the metric as Bot Duration, you have an additional option to convert the bot duration to percentage. This option appears only if a selected group or subgroup is of date type variable. Operations dashboard on page 1320	

Known limitations

Due to security reasons, you cannot access the following Bot Insight APIs and a 403 forbidden error is displayed.

```
GET/v2/botinsight/data/api/gettasklogdata
GET/v2/botinsight/data/api/gettaskvariableprofile
DELETE/data/api/deletetasklogdata
GET/data/api/getbotrundata
GET/data/api/getaudittraildata
```

Automation Anywhere Robotic Interface (AARI)



Important: This AARI version is available for all users starting from Enterprise A2019.16.

New features

Assign tasks

Enterprise A2019

AARI managers and users can now assign tasks. Managers can assign and reassign tasks to any users from teams with an assigned process. Users can assign tasks to other users of the same team.

[Assign a task](#) on page 923

Filter and search tasks

Enterprise A2019

AARI users can now perform the following tasks:

- Filter, sort, and search tasks for quick results
- Search task names using Search Title
- Sort by completed, pending, and unassigned tasks using the Filter option
- Configure results based on assignee or title using Advanced filter
- Click a column to sort by ascending or descending orders

[Filter and search for a task](#) on page 926.

Summarized information of tasks

Enterprise A2019

The Tasks tab in the main page shows statistical insight for the numbers of completed, pending, and unassigned tasks.

Process package

Enterprise A2019

The Process package enables users to create a request inside a specified process from a bot.

[Process package](#) on page 744

New features
Preview bot Enterprise A2019 Human Tasks and Bot Tasks now include the Preview bot option, which enables users to quickly preview relevant bot or forms information.
Process editor metadata Enterprise A2019 Human Tasks and Bot Tasks now accept username and email metadata. Users can enter the name and email values to their process workflow such as <code>\$Task.assignedTo{username}\$</code> and <code>\$Task.assignedTo{email}\$</code>.
Enhancements to roles Enterprise A2019 The AARI admin can now assign a process to a team they created and become the manager assigned to that process. The admin can also assign a process to a team they did not create and the manager of that team is assigned to the process.
Administration permission Enterprise A2019 The AARI admin and manager are now assigned a new Administration permission by default called View Users and Roles basic information. The admin can now view the process management page to assign or unassign managers.

Changed features
Process management page The process management page in AARI on the web is now removed for managers.
Password field in request view The Password element is now removed when viewed in the request tab.

Fixed features	
Service Cloud case ID	Description
--	A team name is no longer limited to 20 characters.
--	When you open many request tabs, the navigation bar now functions properly and allows you to navigate to your tabs by using the arrow icon.
--	When you view tasks in the request view, the request and task now show the correct status.
--	The manager can now be removed in the process management page.
--	The bot status in the request view is now represented as a progress bar.

Fixed features	
Service Cloud case ID	Description
--	The Element name field in the process editor now shows the correct error message when the field contains spaces.
--	When you select the Make field uneditable option for the Checkbox, Date, Dropdown, Number, Password, Radio Button, Text Area, and Text Box elements, the values can no longer be edited.
--	The team management page now shows the Owner column.
--	When number values are entered in a number field, such as a phone number box, the values are now accepted.
--	In the device pool configuration page, the Bot Runner users check box is now selected.
--	The Checkbox and Radio Button elements now support horizontal format.
--	The Document element can now access the Open the doc in browser link.
--	The Number element values are no longer limited to 8 characters and can now be rendered properly when the values contain trailing zeroes, commas, and decimals.
--	When you select the Insert a variable option in the process editor, the Variable field now shows specific variable names.
--	The redo functions now works properly in the process editor.
--	The Text Box element now accepts number-only inputs.
--	The timestamp of the closing step now shows the timestamp of the last step in request view.
--	When you access a public process, the existing variable in the field can no longer be changed.
--	The Masked data option is now fully supported for all elements.
--	When you edit a checked-out process that contains conditional steps with variables, you can now edit and save these conditional steps.
--	When a process is configured with two forms that contain a Dropdown element, the process creation shares the Dropdown element data between the forms. The Dropdown element in the second form now receives data from the first form.
--	The manager can now access their team without encountering any errors.
--	You can now update values in a prepopulated text field in request view.
--	When you create a request and encounter a preprocessing error, the request creation ends and the request view now shows the failed status.

Fixed features	
Service Cloud case ID	Description
--	The Go To option in the process editor now shows the Human Task or Bot Task name.
--	Users with the AARI manager and user roles are now automatically redirected to the web interface when they access the Enterprise Control Room URL.

Known limitations	
When you provide your Bot Task and Human Task the same element name, an error occurs for the Go to element, but the process editor does not prompt an error. Workaround: Create unique element names for your Bot Task and Human Task.	
When you create a form that contains a Document element and access your Human Task in the process editor, you cannot assign your variable because the Add element option is not available.	
The Display message field in the If/Else pair action does not function correctly when displaying a message in request view.	
The titles (Title field) of completed requests in AARI on the web are replaced by endpoint display names.	
When you create a form that contains a Number field set to a 10-character limit and you enter 1234567890 in the number field in request view, the number values are not accepted.	
When you create a process with a form that contains a Date element, the Condition option in the If/Else pair action does not allow you to enter a variable.	

Enterprise A2019.15 Release Notes

Release date: 14 August 2020

Review the new features, supported packages, changed features, fixed features, security fixes, and known limitations in the Enterprise A2019.15 (Build 5933) release. IQ Bot and Discovery Bot are on Build 5931.

- [Enterprise A2019](#) on page 97
- [Discovery Bot](#) on page 107
- [IQ Bot](#) on page 108
- [Bot Insight](#) on page 110
- [Automation Anywhere Robotic Interface](#) on page 111

Enterprise A2019

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Introducing Discovery Bot and Automation Anywhere Robotic Interface Enterprise A2019 Discovery Bot on page 107 Automation Anywhere Robotic Interface on page 111
Migration from 11.x and 10.x to A2019 (currently available only to those in the Migration Early Adopter Program) Enterprise A2019 Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program or a timeline for when migration will be available to all customers, contact your Automation Anywhere representative.
Perform an action on multiple objects of the same type Enterprise A2019 The variable anchor in AISense Recorder enables you to perform an action on multiple objects of the same type. Use variable anchor on page 854
Run 11.x bots from Enterprise A2019 Enterprise A2019 The V11 TaskBot package enables you to run 11.x bots from Enterprise A2019 in the 11.x Enterprise Control Room. V11 Task Bot package on page 820
Enhancements to the Interactive forms Enterprise A2019 Interactive forms include the following updates: - You can include the Dynamic element of the selected form in the Change label action. - In the Dynamic area actions: - You can add a maximum of four elements for the Add row in Dynamic area action. - In the Add element screen, use additional options from the Type drop-down menu such as Checkbox, Dropdown, File, Snapshot, RadioButton, Text Area, and TextBox. Interactive forms package on page 665
Support for interactions with Oracle EBS tables Enterprise A2019 and Community Edition Use the Universal Recorder or the Recorder > Capture action to read data from an Oracle EBS table. The following actions are now supported: - Get Total Row - Get Total Column - Get Cell text by Index - Get Cell index by text

New features
Expanded data type support in DLL package Enterprise A2019 and Community Edition The DLL package now accepts dictionary and list variables as input parameters or to hold action output. Using the Run function (Legacy) action on page 581
Create device pools using API Enterprise A2019 You can now create a device pool and add unattended Bot Runners to the device pool using an API. This API uses deviceId, automationScheme, ownerId, and consumerId as parameters to create a device pool. Create device pool API on page 1219

Supported packages	
Package	Version
Node Manager	12.1.6000
Application	2.0.0-20200721-221935
App Integration	1.0.0-20200721-221933
Analyze	2.2.3-20200624-011702
Active Directory	2.0.1-20200721-221930
Boolean	2.0.0-20200721-221936
Bot Migration	2.4.0-20200604-174031
Browser	2.0.0-20200721-221938
Clipboard	2.0.0-20200721-221947
Comment	2.0.0-20200721-221948
CSV/TXT	2.0.0-20200726-052504
Database	2.0.0-20200723-022707
Data Table	2.0.0-20200721-222456
Datetime	3.0.1-20200721-222000
Delay	2.1.0-20200721-221959
Dictionary	2.0.0-20200624-041629
Run DLL	2.0.0-20200721-222437
Email	2.0.0-20200721-222003
Error handler	2.0.0-20200721-222009
Excel basic	2.0.0-20200721-222339
Excel advanced	4.0.0-20200723-234413

Supported packages	
Package	Version
File	2.1.0-20200624-041638
File & folders	2.1.0-20200721-222011
Folder	2.1.0-20200721-222013
FTP / SFTP	2.0.0-20200721-222017
IF/ELSE	2.0.0-20200721-222021
Image Recognition	2.0.0-20200721-222024
Interactive forms	2.15.0-20200729-084624
IQ Bot	2.0.0-20200415-125005
JavaScript	2.0.0-20200721-222202
Simulate keystrokes	2.1.0-20200721-222204
Legacy Automation	2.0.0-20200721-222207
	1.0.0-20200515-133334
List	2.0.0-20200721-222211
Log To File	2.1.0-20200721-222212
Loop	2.0.0-20200721-222213
Message Box	2.0.0-20200721-222213
Migration	2.4.0-20200728-033126
Mouse	2.0.0-20200721-222218
Number	2.0.0-20200721-222224
OCR	2.1.0-20200721-222225s
Office 365 Excel	2.0.0-20200721-222319
Office 365 Calendar	2.0.0-20200721-221944
Office 365 OneDrive	2.0.0-20200721-222326
PDF	2.4.0-20200721-222331
PGP	2.1.0-20200721-222333
Ping	2.0.0-20200721-222334
Printer	2.0.0-20200721-222342
Play Sound	2.0.0-20200721-222335
Prompt	2.0.0-20200721-222344
Python Script	2.0.0-20200721-222345
Recorder	2.0.6-20200626-193519
REST Web Service	2.0.0-20200721-222436
SAP	2.1.0-20200723-234637

Supported packages	
Package	Version
Screen	2.0.0-20200721-222442
SNMP	2.0.0-20200721-222445
SOAP Web Service	3.0.0-20200721-222448
String	3.0.0-20200721-222454
System	2.0.0-20200721-222454
Task	2.0.0-20200624-103759
Terminal Emulator	3.2.0-20200721-222500
Trigger Email	1.1.0-20200721-222511
VBScript	2.0.0-20200721-222503
Wait	3.0.0-20200721-222505
Window	2.0.0-20200721-222507
Workload	2.0.1-20200721-222508
XML	2.0.0-20200721-222509

Changed features
User validation for change in authentication type (Service Cloud case ID: 00602788) Enterprise A2019 The username is now validated when an admin user updates the Enterprise Control Room authentication configuration from Database to SAML (Administration > Settings > User Authentication). An error message appears if the username already exists. Set up SAML authentication on page 388
The Before and After fields in the String > Extract action are now optional (Service Cloud case ID: 00617151) Enterprise A2019 and Community Edition Users can now build and run bots that do not have a value in the Before or After fields. This ensures migrated bots that contain the String > Extract action can run without disruption.
Improved debugging for Image Recognition actions Enterprise A2019 and Community Edition When a bot fails while running one of the Image Recognition actions, the captured source and target images are stored in the log folder. Users can review the images to identify issues such as the application image not captured correctly or low quality of the image due to differences in the Bot Creator and Bot Runner devices. Image Recognition package on page 660

Fixed features	
Service Cloud case ID	Description
00609293	The AATaskName system variable now uses a backslash (\) to support the migration of 11.x bots that use this variable to Enterprise A2019.
00600367, 00620149	When calling REST APIs for using the REST Web Service command, the API now returns the correct status and the response code.
--	When Work Items are processed for automation in the Bot agent, you can now view the workload automation name in the Workload > Queue > View Activity in progress and Run bot with queue > View pages, even when the workload automation ID and schedule automation ID are the same in the Enterprise Control Room database.
00606636	The migration of 11.3.x bots that read a date from a file to an Enterprise A2019 variable now results in the correct date format: dd/mm/yyyy. Previously, a series of numbers were displayed in Enterprise A2019.
00576004	Fixed an issue where some emails were retrieved with HTML tags, even when the user selected the Plain text option.
00585830	Fixed an issue where the Loop > For each meeting in calendar iterator only returned details for the first meeting of the day. Now, the output variable refreshes after each iteration and returns details for each meeting.
00505228, 00576757	When the browser language is set to Japanese, error messages from the Control Room > Administration > Settings > Email page are now displayed correctly. The distorted Japanese character issue is now fixed.
--	You can now check in any forms or bots in the Public folder that were created using any of the earlier versions of Enterprise A2019.
--	You can now use the Get action without any errors for an empty dynamic element of a form during bot runtime.
00575400, 00597633	You can now use Email trigger to start a bot even when Microsoft Office is set to a non-English language.
--	If you are using the Snapshot element, the form is no longer minimized even if you set an invalid file path to save the snapshot during bot runtime.
00566225	If you add a form with a Japanese name, error messages are not displayed during bot runtime.
00571773	If you have added element label or text in Japanese and set Font name > System default, the form elements are now displayed without any distortion during bot runtime. Create a form on page 931

Fixed features	
Service Cloud case ID	Description
00620911	For the Select file element in a form, the file path is now displayed correctly when you select a file with a Japanese name during bot runtime.
--	If a form has a Dynamic field, any errors within any of the available elements are now displayed immediately during bot runtime.
--	An error is now displayed if you use the Tab key to navigate out of the Dropdown element in a form during bot runtime.
00616251	If a Bot Runner (attended or unattended) user is running a bot and an event trigger that is associated with this user starts, the event trigger is now queued and deployed after the current bot has completed.
00557617	The Simulate keystrokes action now supports ASCII characters when the device language is set to Russian.
--	Installing cloud-based license files is now supported on Enterprise Control Room deployments using Linux CentOS 7.
00615038	All packages and actions now work with the "Portuguese (Brazil)" browser language. Previously, some packages and actions caused an unresponsive Enterprise Control Room when "Portuguese (Brazil)" was selected as the browser language.
--	You can now reset the password successfully when the service credential expires or is disabled. Previously, users intermittently experienced issues while resetting the password.
--	The default logging for Bot agent is no longer in debug mode. Previously, debug mode was the default logging, which caused an increase in the number of logs and resulted in high storage space and decreased system performance.
00588077	If you create a copy or edit the content of an existing CSV file, the modified content that is uploaded in the Enterprise Control Room will now display correctly and will not cause any run-time error when the bot is executed.
00541524,00531540	You can now run bots even when the path of the bot location is more than 255 characters. Previously, the bot failed with an error.
00615106	The Bot Scanner now analyzes large bots within a few minutes.
00610366	Keyboard shortcuts such as Ctrl+C, Ctrl+V, and Ctrl+X work as expected on Internet Explorer.
00577850, 00608065, 00597132, 00596397, 00619463	The Enterprise Control Room now does not become unresponsive after a period of inactivity.
00608824	An error is no longer encountered when a bot opens the Excel application after it is forcefully terminated.

Fixed features	
Service Cloud case ID	Description
00542144	The wait option in various packages now works as expected for applications based on HTML technology. Previously, the wait option used to wait for a period in multiples of 15 seconds based on the value provided. For example, if the wait value was in the range of 1-14, the system waited for 15 seconds.
00508478, 00504802, 00569822	An error is no longer encountered when a bot is running and an application window is closed when the bot is performing the find window operation.
00494857	A user that does not have the Register device permission can no longer register a device by creating a custom Bot Creator role.
00501619, 00614130, 00620198	An error is no longer encountered when a user deletes a device after upgrading to a later version of Enterprise A2019.
00616786	Fixed an issue where periodic scheduled bot deployments failed with the following error message (even though the credentials provided by the bot is correct): <pre>Either your username or your password is incorrect. This might be due to a misspelling, your Caps Lock might be on, the password might have expired, or the domain might be required. To continue, retype your username and password.</pre>
00494893	Fixed an issue where the Error handling > Catch action was not handling a runtime error with the record variable. Previously, the Catch action did not capture an <code>index out of bounds</code> error when the record variable was entered in a Message box action with the index specified by name.
--	The Get Property datetime format within the Active Directory package now displays the information using the system datetime format.
--	When you edit a bot using a previous package version (for example, Enterprise A2019.13 version) and the Desktop session automatically starts, if you exit the Bot editor while the Desktop session is trying to launch, the current package version will now be displayed when you open a new Bot editor instance. Previously, the previous package version (for example, Enterprise A2019.13 version) was displayed.
00563346	Credentials with non-ASCII characters are now allowed to be stored in the Credential Vault in the Enterprise Control Room. Therefore, when you run TaskBots to open files that are protected using passwords containing non-ASCII characters, the application does not respond with an HTTP 500 error.
00525552, 00470841	The Run task no longer fails when the child bot name contains allowed special characters. Previously, when the child bot name contained allowed special characters, the run task displayed an error message.

Fixed features	
Service Cloud case ID	Description
00501212	Fixed an issue in the SMTP settings where the Enterprise Control Room was sending notification emails for all of the conditions, including the disabled conditions.
00607005	A security scan of Enterprise A2019 no longer reports the Recorder package as a malicious software. Previously, the security scan reported it as a malicious software because the <code>check.exe</code> file was missing the root identification certificate.
00564129	On an operating system configured for Japanese, the Roles pages in the Enterprise Control Room now shows English text as expected when you select English in the Enterprise Control Room language selection.
00629523	When you upgrade from an earlier version of Enterprise A2019 to a later version and change the If package version to the latest one, conditions combined with the AND or OR condition now appear in the logic. Previously, except for the first condition, the rest of the conditions with the AND or OR condition were not shown.
00631477	When Work Items from multiple queues are processed for Workload automation from one device pool with the round-robin method for a time slice of 5 minutes, the Workload automation does not run in a loop and thereby causing an increased CPU usage.
00633829	As system admin permissions for Workload automation are verified by the application when you run a bot with queue from a single device pool to process multiple Work Items concurrently, CPU usage does not increase drastically.
00615086	Fixed an issue where the Java Application Launcher continued to run after a user stopped the Bot Scanner, which caused device performance issues for some users.
--	Variables of the List type are now available for migration from 10.x and 11.x to Enterprise A2019.
00607949	Disabled packages will not be enabled when you upgrade from an earlier version of Enterprise A2019 to a later version. Previously, packages that were disabled were enabled after an upgrade.
--	You can now debug a bot with watch variables that contain Japanese characters. Previously, watch variables containing Japanese characters did not output a value.
00623186, 00624876, 00624060, 00627123, 00629873, 00639523, 00630880, 00634577, 00636166	The correct status of a deployed bot now appears instead of <code>Device yet to be determined</code> in the Enterprise Control Room Activity page, and the user is allowed to delete the device that has completed running a bot. The following message no longer appears: <code>Device is part of active deployment</code> .

Fixed features	
Service Cloud case ID	Description
00573461	Fixed an issue where a bot was failing in preprocessing mode if the user had inserted and then disabled the Error Handler > Catch action without also disabling the Finally or Catch actions.
00629046	In the Database package, when you use Microsoft Excel as a database, the bot launcher now executes properly. Previously, the bot launcher stopped working when reading data from an Excel sheet that had some empty rows.

Security fixes	
Service Cloud case ID	Description
00491697	The Transport Layer Security (TLS) protocol using CBC mode of encryption for configuring the network security of the Enterprise Control Room is now secured from man-in-the-middle or crystallographic timing attack.

Known limitations	
When you add a form with the Dynamic element to a bot, click Add element, select Dropdown or Radio group as the Type, and leave the Default value/ Default path field blank, the elements appear as labels during bot runtime.	
You can move a form around by dragging the title bar during bot runtime.	
When you copy and paste the filepath for the Select file element of a form during bot runtime, invalid characters are displayed.	
When the Set focus action is assigned to a disabled form element, an error icon is displayed when the focus is lost during bot runtime.	
When you enable any of the disabled fields during bot runtime, error icons are not displayed.	
Error messages during bot runtime are not displayed in the language selected in the Enterprise Control Room.	
If email trigger is used to start a bot, the status of the most recent email that you have viewed is changed to Unread every time any bot is triggered based on the trigger interval set in the Check every drop-down menu.	
In an Enterprise Control Room configured for Active Directory users, the following message appears after the first admin user is created: Do you want to leave this page? Workaround: Click Stay on page so that you can go to the Enterprise Control Room login page.	
If the device is already registered by a user other than the Bot Creator and the Bot Creator has the Register device permission, then when you run a bot from the Bot editor window, the deployment fails at the Connecting your computer to Enterprise Control Room step.	
The migration process does not migrate manual dependency files added in the 11.x Enterprise Control Room using the API. Bots associated with these dependencies will be migrated successfully but will fail during execution because the system cannot find these dynamically added dependency files at runtime in Enterprise A2019.	

Known limitations

When a bot execution is in progress and the Enterprise Control Room server refreshes, the progress status of the In-Progress activity will not be displayed even though the bot execution continues without interruption.

Discovery Bot

Introduction

Discovery Bot enables process automation by capturing document processes, identifying automation opportunities from business processes, and prioritizing opportunities based on ROI. Users can convert these opportunities into automated processes.

[Process Discovery using Discovery Bot](#) on page 951

Known limitations

When HTTP proxy is installed in a cloud environment, you can use the Discovery Bot recorder to record processes.

Custom role setup for Discovery Bot is currently not supported.

The Discovery Bot recorder continues to record your steps even after you have logged out of the Enterprise Control Room.



Recommendation: Manually stop the recorder to end the recording session.

The Discovery Bot recorder displays an internal error message when accessing Google Apps. Pause the recording and then resume the recording again to recapture the steps.

The recent recording (ID) created is displayed at the end of the list in the Recordings table. You cannot sort on the recording ID at this time.

The recording count for a process is incremented by one even if a user stops or cancels a recording session. The incremented number is displayed in the Recordings section in the tile for a process.

By default, you cannot move the endpoint in an upward direction in the path flow to change the selection of the steps. You can move the branch endpoint lower in the path flow to include more than one step.

You must add at least one step to a branch for you to select the branch and create an opportunity.

You must select all steps in a branch to create an opportunity. Selecting partial steps in a branch will result in branch being dropped in the opportunity that is displayed from the Opportunities tab.

Currently, the copy of field does not display the correct view information from the view (view ID) that it is copied from.

If the Enterprise Control Room is not installed in the C:\ drive (C:\Program Files \Automation\Enterprise), the Discovery Bot installer fails to install correctly. If the Enterprise Control Room is not installed in the C:\ drive, then perform the instructions provided in this article:[A2019.15 Discovery Bot installation issue with non-OS drive \(A-People login required\)](#).

The Export to Word option supports a maximum of 500 steps.

The Convert to Bot option supports a maximum of 500 steps.

IQ Bot

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

For feature information about IQ Bot A2019, see [IQ Bot A2019 feature comparison matrix](#) on page 234.

The IQ Bot Cloud version provides users with automatic provisioning for up to three environments such as Development, Test, and Production.



Note: IQ Bot Build 5931 is compatible with Enterprise A2019 Build 5933.

New features

New IQ Bot Pre-processor package

IQ Bot A2019 On-Premises and Cloud

The following new actions are available as part of the IQ Bot package:

- Convert image to PDF
- Get barcodes
- Get document info
- Get page content

[IQ Bot Pre-processor package](#) on page 672

Search by filename in Validator

IQ Bot A2019 On-Premises and Cloud (Service Cloud case ID: 00372981)

Use the Search by filename field in the Validator screen to search a document in IQ Bot A2019.

[IQ bot Validator enhancements](#)

IQ Bot [Local Device] package (currently available on request only)

IQ Bot A2019 On-Premises and Cloud



Important: Contact your Automation Anywhere representative to request the On-Premises package. For Cloud, it is available as a pre-installed package.

Use the IQ Bot [Local Device] > Process documents action to process documents using TaskBots created in the Enterprise Control Room. You can scale by processing documents on multiple devices simultaneously without setting up a separate IQ Bot cluster. You can set this up using workload management (WLM) in the Enterprise Control Room.

[Workload management](#) on page 1079

The validation is done using the current IQ Bot Validator and usage metrics on the dashboards, which is available with the installed IQ Bot server.



Note: You can create validators using interactive forms if they do not want to send data to the IQ Bot server.

[IQ Bot \[Local Device\] package](#) on page 671

New features	
IQ Bot Classifier package (currently available on request only) IQ Bot A2019 On-Premises and Cloud The IQ Bot Classifier package enables you to group documents into appropriate learning instances for content extraction. This package is not available as part of the standard IQ Bot A2019 installation.  Important: Contact your Automation Anywhere representative to request the package. IQ Bot Classifier package on page 669	
Migrate learning instances using Migration Utility IQ Bot A2019 On-Premises and Cloud Use the Migration Utility feature to migrate learning instances from one environment to another. Additionally, you can back up, restore, download, delete, and upload learning instances. Migrate learning instances on page 514	
Control creation of groups IQ Bot A2019 On-Premises and Cloud Use the New groups creation setting section in the Learning Instance > Edit page to limit creating groups when uploading training documents to IQ Bot. Use the Threshold to create new groups value and Never create new groups check box to define the parameters. Bots	

Changed features	
For the Custom Logic feature, the identified list of Python libraries now includes an additional set of trusted libraries for IQ Bot A2019 On-Premises and Cloud. Go to Automation Anywhere support for a list of the safe libraries you can use. List of Pandas Libraries which are supported and not supported on A2019 IQ Bot (A-People login required)	

Fixed features	
Service Cloud case ID	Description
00376179	The Automation Anywhere Cognitive Project is now created without any errors even when you use the IQ Bot batch files to install or uninstall IQ Bot A2019.
00560185	The Download Document in IQ Bot A2019 now runs without any errors, irrespective of the language in which the learning instances are saved.
00574815	You can now use the Google Vision API engine to classify the selected PDF files without creating any unclassified groups.
--	Documents are now classified correctly by the Google Vision API, irrespective of the display limitations set. Previously, an incorrect resolution limitation created unclassified documents.

Fixed features	
Service Cloud case ID	Description
--	You can now use Internet Explorer to save a document or mark it as invalid in the learning instances validator screen, without any error messages.
00620237, 00623175	After logging in to the Enterprise Control Room as an IQ Bot administrator, the IQ Bot tab is no longer displayed in the navigation bar.
--	The Output .csv file generated for a validated document and validated data are now displayed without any error messages.
00605607	When you click Save current document in the validator screen, the document is saved without any errors and the corresponding .csv file is created in the output folder.

Known limitations	
IQ Bot On-Premises and Cloud	
When you click the Save and go to next group option, the available groups or the learning instances are sometimes not displayed.	
IQ Bot On-Premises and Cloud	
A validation error message along with the corrected field is displayed in the output (.csv) file for documents validated using ValidatorURL.	
IQ Bot Cloud (Service Cloud Case ID: 00647700, 00657619, 00656643)	
The output (.csv) files are not downloaded even when you click Download all documents button, and an error message is displayed.	
Contact Automation Anywhere support for more information.	

Bot Insight

New features	
Date Interval option	
Enterprise A2019	
When you create new widgets that support date fields for a group or subgroup, the Date Interval option is enabled with the default option set to Month.	
Configuring a Line Bar Chart query on page 1335	

New features
New clustered line bar chart widget Enterprise A2019 and Community Edition The Clustered Line Bar Chart widget enables you to view and analyze information about your metrics and attributes. You can provide two metrics and two attributes in your clustered line bar chart. Now when two attributes are selected, a clustered graph grouped by primary and secondary attributes is displayed. Bot Insight visualizations on page 1334
New Device dashboard in the Operations dashboard Enterprise A2019 and Community Edition The Bot Insight Device dashboard displays various widgets that provide information about the utilization of the machines on which the bots are executed. You can analyze the device utilization and activity history of different Bot Runner machines. Operations dashboard on page 1320

Fixed features	
Service Cloud case ID	Description
00540647	Dates are now displayed correctly on the dashboard after the data is grouped based on the date. Previously, incorrect dates were shown on the dashboard.

Deprecated feature
The Widget Event Distribution by workbench is removed and will no longer be displayed in the Audit Dashboard.

Automation Anywhere Robotic Interface

Introduction

Automation Anywhere Robotic Interface (AARI) enables users to design a process workflow to address their business requirements. The processes incorporate human and bot tasks using forms to define parameters and render supported UI elements on the web. When using AARI on the web, users create requests to use their created process workflow for process instances (case) and run their tasks.

AARI is available as a part of the Enterprise A2019 installer. You can view the AARI components in the Administration page.

[Get started with Automation Anywhere Robotic Interface](#) on page 907



Important: This AARI version has limited availability and is available only to sales and internal users.

Known limitations
When you edit a checked-out process that contains conditional steps with variables, you cannot edit and save these conditional steps. The steps will revert any new variables you add. Workaround: Delete and add a new condition.
The If, Else If, and Else actions cannot be placed before another bot logic in your workflow. You can only place these actions at the end of the bot logic. Workaround: Make a clear boundary on the conditional block.
In a process, when you use a date format such as 2020/07/04 in the input_date field in Bot Task, the bot does not accept the date input. Workaround: Create a separate date variable to use an input.
Form elements that are not supported and are deleted by the process editor include: Button, Dynamic, Select File, and Snapshot. Workaround: Instead of using the Button element, add a form action.
The Import bots and Export bots user interface labels do not match for a process but are still applicable to importing or exporting a process.
When you access a public process, the Request display name field in Process entry is not locked and can be edited. The existing variable in the field can be changed but not saved.
The Task display name option in Process entry has a field set to initialData that cannot be edited in the process editor.
The Feed data into form table in the process editor does not allow editing.
The Element name field in the Bot Task and Human Task cannot contain spaces.
When you create two forms and assign the data of the first form to the second form using <code>\$FormStep.input[]</code>, the second form data is not evaluated.
Redo functions are only available for canvas interactions. The redo functions are not available by default until your first canvas interaction. The functions are available again when you interact with your second canvas.
A team name that has a length of 20 characters or more is not accepted.

Known limitations	
Limitations in AARI on the web	
Navigation bar	When you open too many request tabs, the tabs are hidden in the navigation bar.
Timestamp	The timestamp of the closing step shows a duplicate timestamp of the starting step in request view.
Imported process	When you export a process from an Enterprise Control Room and import that process as public to another Enterprise Control Room, the imported process cannot be viewed. Workaround: You can check in and then check out the process, or import the process as private and then do a check-in.
Configuration page	In the device pool configuration page, the Bot Runner users check box cannot be deselected. Workaround: Double-click the check box in the header.
Process management page	A check-in process that is deleted from the Enterprise Control Room repository is still visible in the process management page.
Form rendering	• The Masked data option is not fully supported for all elements. When this option is added to hide data, the data is visible. • The Checkbox and Radio Button elements do not fully support horizontal format. When these elements are configured to display horizontally, the elements are displayed vertically instead. • The Document element is not fully supported. When this element is configured to a Default file path, the entire document is not rendered. • The Number element encounters issues with large numbers. When this element is configured to contain three number fields and number values with trailing zeroes, commas, and decimals, these values are not honored and are not rendered. When number values are entered in a number field, such as a phone number box, the number values are not accepted. • The Text Box element encounters issues with number-only input. When this element is configured in a form to submit data, the Submit option is not enabled when the field contains only numbers. • The Password element encounters issues with maximum character limits. The maximum limit is not enforced when a password is entered in the initial form. This element does not contain values when

Enterprise A2019.14 Release Notes

Release date: 9 July 2020

Review the new features, supported packages, changed features, fixed features, and known limitations in the Enterprise A2019.14 (Build 5322) release. There are no security fixes in this release.

- [Enterprise A2019](#)
- [IQ Bot A2019](#)
- [Bot Insight A2019](#) on page 128

Enterprise A2019

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Migration from 11.x and 10.x to A2019 (currently available only to those in the Migration Early Adopter Program) Enterprise A2019 Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program or a timeline for when migration will be available to all customers, contact your Automation Anywhere representative. • Workload management (WLM) data is automatically migrated to A2019 when you install A2019 and point the Enterprise Control Room to the restored 11.x database. How WLM data is migrated on page 439 • Version 11.3.1 and Version 11.3 are certified for migration to Enterprise A2019. Understanding Enterprise A2019 migration on page 430 • Additional support is provided for packages and variables. Package mapping for migration on page 453 Variable mapping for migration on page 482 • Migrate TaskBots and MetaBots created in 10.x to Enterprise A2019 using APIs. 10.x Migration APIs on page 1233
Bypass legal disclaimer Enterprise A2019 When you allocate a device license to a user, the Bypass legal disclaimer option is automatically enabled to allow the user to run bots on the device without having to manually acknowledge a disclaimer. Create a user on page 1106

New features Choose to automatically update Bot agent (Service Cloud case ID: 00497873) Enterprise A2019 and Community Edition An Enterprise Control Room administrator can now choose to automatically update the Bot agent to a later version (Administration > Devices) using the auto-update capability. In the earlier version, each Bot agent had to be updated manually after logging in to a device, resulting in more downtime.  Note: In this release, Bot agent users have to update each Bot agent manually. From subsequent releases, the auto-update setting will be applied and each Bot agent will be updated automatically. - For Enterprise A2019 Cloud and Community Edition, the auto-update option is enabled by default. - For On-Premises, the default update option is set to manual. Automatically update the Bot agent on page 412	Universal Recorder new features Enterprise A2019 and Community Edition - The Universal Recorder can now capture objects in SAP versions 730, 740, and 760 patch 5. - You can build automations in an SAP application using multiple connections (user accounts) and several sessions per connection at one time. - You can now record and run bots to capture objects from a Google Chrome browser that does not have a zoom level setting of 100%.
Capture active text, passive text, image button, and scroll in combo box in AISense Recorder Enterprise A2019 You can now capture active text, passive text, image button, and scroll in a combo box from a remote application when recording a task with AISense Recorder. Record a task with AISense Recorder on page 847	New Database package features (Service Cloud case ID: 00537047) Enterprise A2019 and Community Edition - The Connect action now enables you to connect to an Excel database. - Use the Export to data table action to retrieve records from the database and store the retrieved data in a table variable. - You can now store the output of the Run stored procedure action in a dictionary variable. Using Connect action for database on page 559 Using the Export to data table action on page 566 Using the Run stored procedure action on page 562
New Active Directory package available Enterprise A2019 and Community Edition Use actions from the Active Directory package to manage users across a group or organization. You can perform operations such as create, modify, and delete users, groups, or organizational units with centralized control. Active Directory package on page 523	

New features
Log in securely when connecting to Active Directory server Enterprise A2019 and Community Edition You can use the Connect action from the Active Directory to enter your credentials (username and password). You can either insert the credentials from the Credential Vault or insert a variable that holds a credential type value. Using the Connect action on page 527 Credentials and credential variables in the Bot editor on page 878 User-defined variables on page 869
Support for Excel cell formats, including Number, Percentage, Currency, Scientific, and Date Enterprise A2019 and Community Edition Use the Get single cell and Get multiple cell actions from the Excel basic package and the For each row in worksheet Loop iterator to retrieve values in the format set in the Excel worksheet. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable. Excel basic package on page 601 Loop package on page 687
Automate a task on a range of cells in an Excel worksheet Enterprise A2019 and Community Edition Specify a cell range in the Delete cells action to perform the operation on the cells in the range. Excel advanced cell operations
New PDF package action Enterprise A2019 and Community Edition Merge multiple PDF files into a single PDF file using the Merge documents action. Using the Merge documents action on page 739
Support for Czech and United States 2 code pages in Terminal Emulator package Enterprise A2019 and Community Edition The TN3270E and TN5250E terminal types support the Czech and United States 2 code pages. Use the Connect action to select the terminal type and code page. Using the Connect action on page 811
Proxy support for packages Enterprise A2019 If a device is configured with a proxy, all outbound requests from the following packages are routed through the proxy server: • Recorder • REST Web Service • SOAP Web Service

New features
Form builder enhancements Enterprise A2019 The form builder now includes the following new elements: • Dynamic - Enables dynamic rendering of the selected area. • Snapshot - Enables you to take a snapshot of the form.
Enhancements to actions in Interactive forms Enterprise A2019 • Enhanced highlight action The Highlight action in the Interactive forms includes a Highlight type drop-down menu. You can use Warning or Error to highlight the selected form element during the bot runtime. • New Change label action Use this action to change the label or title of the selected element of a specific form. • Dynamic area action • The Add row in Dynamic area action enables you to append or overwrite a dynamic element of a form. • The Clear action enables you to remove the dynamic elements. Interactive forms package on page 665
Retrieve trigger event data Enterprise A2019 You can now retrieve the trigger event data during bot runtime by defining a variable as the input type. Add a file and folder trigger on page 948
Record variable support for schema Enterprise A2019 and Community Edition You can create a new record variable with a schema to set the order of the fields and the type of data that can be entered into each field. Record variable on page 875
Product interface now available in Russian language Enterprise A2019 Enterprise A2019 is now available in Russian. Internationalization, localization, and language support on page 309

New features
Clone and view content in Enterprise Control Room Enterprise A2019 The Enterprise Control Room now includes the following new permissions: • View content: This permission allows you to view the contents of a cloned bot. This permission applies to both public and private workspaces. • Clone: This permission allows you to create a read-only copy of the bot from the public workspace. The same bot can be cloned by multiple users. This permission applies only to the public workspace. Bot permissions for a role on page 1119
New condition in the If and Loop packages Enterprise A2019 and Community Edition Use the Dictionary > Check key condition to execute actions based on whether the value of the specified key is Equal to or Not equal to, or Contains or Does not contain the target value. If package on page 656 Loop package on page 687
New encoding type in CSV/TXT and Log To File packages Enterprise A2019 and Community Edition The UTF-16LE encoding option provides support for files that contain the byte order mark (BOM) Unicode character. In the CSV/TEXT > Open action, selecting this option causes the BOM character to be ignored when data is retrieved from the file using a subsequent Read or Loop action. In the Log to file action, this option inserts a BOM character at the beginning of the file. Using the Open action for CSV/TXT file on page 547 Using Log To File action on page 686
Retrieve a list of available users using Device API Enterprise A2019 Use the Device API to identify all available users with unattended Bot Runner licenses, or to filter for users by name. This API returns details of each user, including the user ID, username, and device name. Device API on page 1215
Manually configure time interval value of database connection retries property (Service Cloud case ID: 00573167) Enterprise A2019 and Community Edition You can manually configure the time interval value of the database connection retries in the <code>cluster.properties</code> file. If the database is reconnected within the time specified in the <code>cluster.properties</code> file, the Apache Ignite cache node in the cluster setup will not restart the Apache Ignite server, keeping the device and the Enterprise Control Room user connected. The default value of the time property <code>ignite.max.duration.db.connection.retries</code> in the <code>cluster.properties</code> file is 10000. The recommended maximum time for this property is up to 5 minutes (300000 msec).  Note: Restart the Enterprise Control Room services on each node for the manually configured value of the time property to work effectively. Also, set the time in milliseconds.

New features
Run as user to default device mapping in Workload automation (Service Cloud case ID: 00563115) Enterprise A2019 and Community Edition Workload automation now allows one-to-one (1:1) mapping of the Run As user with default devices when these devices are part of a device pool. Therefore, you can select default devices that are mapped to a Bot Runner to avoid auto-login failures in environments where the security policy does not allow a user to log in to any other device or devices. Add queue, Bot Runner, and device pool on page 1086
Authentication proxy support Support is now available for proxy authentication servers where any application going through the proxy is authenticated and authorized before accessing the internet.

Supported packages	
Package	Version
Node Manager	12.1.6000
Application	2.0.0-20200624-041608
App Integration	1.0.0-20200624-041607
Analyze	2.2.3-20200624-011702
Active Directory	2.0.1-20200624-041605
Boolean	2.0.0-20200624-041610
Bot Migration	2.4.0-20200604-174031
Browser	2.0.0-20200624-041611
Clipboard	2.0.0-20200624-041619
Comment	2.0.0-20200624-041619
CSV/TXT	2.0.0-20200624-041620
Database	2.0.0-20200624-041623
Data Table	2.0.0-20200624-042148
Datetime	2.0.0-20200624-041628
Delay	2.1.0-20200624-041629
Dictionary	2.0.0-20200624-041629
Run DLL	2.0.0-20200630-062222
Email	2.0.0-20200624-041631
Error handler	2.0.0-20200624-041636
Excel basic	2.0.0-20200630-062144
Excel advanced	4.0.0-20200630-062063
File	2.1.0-20200624-041638
File & folders	1.1.0-20200627-151822

Supported packages	
Package	Version
Folder	2.1.0-20200624-041640
FTP / SFTP	2.0.0-20200624-041644
IF/ELSE	2.0.0-20200624-041646
Image Recognition	2.0.0-20200624-041747
Interactive forms	2.14.0-20200629-185534
IQ Bot	2.0.0-20200415-125005
JavaScript	2.0.0-20200630-062021
Simulate keystrokes	2.0.0-20200624-041915
Legacy Automation	2.0.0-20200624-041919
	1.0.0-20200515-133334
List	2.0.0-20200624-041923
Log To File	2.0.0-20200624-041923
Loop	2.0.0-20200624-041924
Message Box	2.0.0-20200624-041925
Mouse	2.0.0-20200624-041929
Number	2.0.0-20200624-041934
OCR	2.1.0-20200630-062040
Office 365 Excel	2.0.0-20200630-062127
Office 365 Calendar	2.0.0-20200630-061819
Office 365 OneDrive	2.0.0-20200630-062133
PDF	2.1.0-20200624-042032
PGP	2.1.0-20200630-062139
Ping	2.0.0-20200624-042035
Printer	2.0.0-20200624-042042
Play Sound	2.0.0-20200624-042037
Prompt	2.0.0-20200624-042043
Python Script	2.0.0-20200624-042044
Recorder	2.0.6-20200626-193519
REST Web Service	2.0.0-20200624-042128
SAP	2.1.0-20200624-042131
Screen	2.0.0-20200624-042134
SNMP	2.0.0-20200624-042137
SOAP Web Service	3.0.0-20200624-042140

Supported packages	
Package	Version
String	3.0.0-20200624-042145
System	2.0.0-20200624-042146
Task	2.0.0-20200624-103759
Terminal Emulator	3.2.0-20200625-032209
Trigger Email	1.1.0-20200624-042201
VBScript	2.0.0-20200630-062305
Wait	3.0.0-20200624-042156
Window	2.0.0-20200624-042224
Workload	2.0.0-20200624-042158
XML	2.0.0-20200624-042200

Changed features
Changes in the Database > Run stored procedure action - It is now optional to enter an input or output parameter name. - You must specify the data type of an input parameter. Choose from Boolean, date, number, or string date type.
The terminal screen for ANSI and VT100 terminals now displays 24 rows, instead of 25 rows as in earlier versions.
Email > Send action interface changes For the Use secure connection (SSL/TLS) and My server requires authentication fields, you must now select True or False, or insert a Boolean variable. Previously, the fields were activated by selecting a check box.
Import bots in public or private workspace Service Cloud case ID: 00456712 Users can now import bots into the public workspace if they have the required permissions, regardless of their licenses. Additionally, users with a Bot Creator license can now import the bots either into the public or private workspace. Import bots on page 1163

Fixed features	
Service Cloud case ID	Description
00554068	In the Community Edition, when you upgrade your Bot agent to a later compatible version, TaskBots created with system variables of numeric type now run successfully. The Enterprise Control Room does not show a preprocessing error when you deploy the TaskBots.

Fixed features	
Service Cloud case ID	Description
00443421	The Run stored procedure action in the Database package runs as expected with Oracle Database when you use input and output parameters.
00557374	The Universal Recorder now consistently captures objects from an SAP application and identifies the technology for those objects as SAP when all prerequisites are met.
00611874	An error is no longer encountered when a variable containing Japanese characters is used in the Write to file action of the Data Table package.
00564534	A modified dependency file with the same name as the original file and a new size is now successfully checked in from the private to the public repository. The old file that was previously checked in is no longer referenced after the modified file is checked in to the public repository, thereby preventing a bot execution failure.
00570537	When you clone a bot with or without dependency files, the cloned bot now displays the actual file size for the bot and its dependency files.
00577247, 00587976	Fixed an issue where the Email > Move all action did not move emails when a bot ran the action on an OS configured with the Japanese language setting.
00552729	The PGP > Decrypt action now works for PDF files.
00487805	You can now access the TN3270 terminal without the terminal screen displaying all text with strike lines. Before using any type of terminal to execute terminal commands, install the latest VC ++ package. Latest supported Visual C++ downloads
00584051	Python 3 script now supports using Unicode characters in input variables. Bot error messages are no longer displayed when Python 3 is used to pass Japanese characters to a variable.
00540651, 00587963, 00593302	You can now use the Assign, Join, Merge, and Sort actions from the Data Table package when you change the default language from English to Simplified Chinese. You can also use the Assign action when you change the default language from English to Japanese, Korean, and other non-English languages.
00577284	The Split document action in the PDF package now executes correctly for a horizontal PDF file, and the large-width output file is not cut off from the sides.
00595357	You can now export and import two different bots (with the same name) in different folders from a staging environment into a production environment.

Fixed features	
Service Cloud case ID	Description
00569527	You can now perform a check-in and check-out of bots with dependencies.
00574309	You can now update or remove Cluster ip addresses from the Elastic search disaster recovery backup cluster setting from the Enterprise Control Room Administration page.
00525854	When a file type variable is used to open an Excel, CSV, or Java script file, bots can now be executed successfully when the file variable is used as an input.
00609184	After the existing license expires, the admin user can now successfully install a new Enterprise Control Room license for an Enterprise Control Room hosted on Linux CentOS.
00576202	You can now insert a user-defined string variable in a message box display when the string variable is included in the expression for multi-line values.
00560706	You can now view the actions menu (vertical ellipsis) to edit or delete the variable string name when the character length is more than 35 characters.
-	For the Checkbox element, changes made to the check box names in the Checkbox content field are now updated when you enable Advance behaviors > Make default selections.
-	You can now set the default selection in Advance behaviors for the Radio button element in a form.
00557395	You can now check in bots that use the variable \$prompt-assignment\$ without receiving an error message. Previously, when you opened the bot in List view, an error icon was displayed next to the actions that contain the variable.
00560356	Previously, when a task that consisted of one or more subtasks was run, the In Progress entry for the task was moved into a historical report with the completion of the first subtask, not the entire governing task. Now, the In Progress tasks are not moved to historical status until the completion of the entire task.
00556113	In Community Edition opened in Google Chrome, you can now select the device icon in a non-English language, and the [link] and [icon] tags are no longer displayed.
00559360	You can now re-import a bot that has failed previous imports. The query did not return a unique result: 2 displayed during re-import attempts is now fixed.
00443590	Fixed an issue where after a bot is deployed on a Bot Runner device, that device is in a different state compared to the state before the bot deployment. For example, if a Bot Runner device is locked before bot deployment, after it is unlocked to deploy the bot, it will now be moved back to lock status.

Fixed features	
Service Cloud case ID	Description
00559507, 00594149	Support for scheduling bots with Internet Explorer version 11 is now improved. Users in the Enterprise Control Room can scroll through multiple pages of scheduled bots without issues with scrolling through the interface.

Known limitations
In Enterprise A2019 On-Premises, a security scan might report the Recorder package as malware because the <code>check.exe</code> file is missing the root identification certificate. You can contact Automation Anywhere Support to get an updated package with the signature fix and upload it to your Enterprise Control Room. Add packages to the Enterprise Control Room on page 1098
Version 10.x or 11.x bots containing commands that have white space in the credential attributes cannot be migrated to Enterprise A2019. The migration process stores some credential attributes in global values in Enterprise A2019. Global values do not support white spaces. To migrate bots that use credential attributes, you can remove the white spaces or replace them with characters.
If you use the Get action for an empty dynamic element of a form, errors are displayed during bot runtime.
If you use Trigger loop: Handle within a bot, link it to a form with Select File element, and set the Select action trigger > Lost focus, the next event is not triggered when you click Browse.
The Set focus action in Interactive forms does not work when you use it to link the fields between two different forms.
In the form builder screen, text is displayed in English even when you change the display to non-English language.
You might see the schedule automation name instead of the Workload automation name in the Workload > Queue > View Activity in progress and Run bot with queue > View pages when Work Items are processed for automation in the Bot agent. This occurs if the Workload automation ID and schedule automation ID are the same in the Enterprise Control Room database.
The Task bot > Run action only supports files selected from the Enterprise Control Room repository. Also, this action only supports file type variables with a set default value and the input option disabled. You cannot modify the file variable value using the File > Assign action.
When you edit a bot using a previous package version (for example, an Enterprise A2019.13 version) and the Desktop session automatically starts, if you exit the Bot editor while the Desktop session is trying to launch, the previous package version will be displayed when you open a new Bot editor instance. However, you should see the Enterprise A2019.14 package version associated with the new Bot editor instance. If you close and reopen the new Bot editor instance, the Enterprise A2019.14 package version will be displayed.

Known limitations
There is an issue for a specific, manually generated license key file supplied by Automation Anywhere to upgrade from Enterprise A2109.13 to Enterprise A2019.14. This issue applies only to customers who are in the following specific category (all must be true): 1. Enterprise Control Room is at the customer premises 2. Enterprise Control Room is running Enterprise A2019.13 or earlier 3. Installed a license file that was provided to them in July 2020 (not self-generated through the customer self-service license portal) 4. User has upgraded the On-Premises Enterprise Control Room to Enterprise A2019.14. For this issue, contact Automation Anywhere for updated license files.  Important: Users who self-generated their license files through the A-People License portal are not affected by this issue. Enterprise A2019 Cloud customers are also not affected by this issue.
A bot that contains the Capture action from the Recorder package fails when both the <code>HTML InnerText</code> and <code>InnerHTML</code> object properties are selected. Workaround: Select only one of the object properties.
The Universal Recorder fails to perform a click, set text, or append text action on the correct control when a debug window or download bar is open. This occurs only in the Google Chrome browser with the device display set to 100%. Workaround: Disable the Google Chrome download bar.

IQ Bot A2019

The IQ Bot On-Premises version supports all the features and functionality available in IQ Bot Version 11.3.4.2.

[IQ Bot A2019 feature comparison matrix](#) on page 234

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

The IQ Bot Cloud version is available for this release and supports all features and functionality available in IQ Bot Version 11.3.4.2. This version provides users with automatic provisioning for up to three environments such as Development, Test, and Production. Users can migrate learning instances between environments using APIs.

New features

Delete bot option in IQ Bot Designer (Service Cloud case ID: 00096258, 00595526)

IQ Bot On-Premises and Cloud

Users with Edit bot permission can view and use the Delete bot option in the Designer. After a bot is deleted from the system, it will not be displayed in the Learning Instance or Bots listing pages.

IQ Bot removes all document details from staging, and all unprocessed production documents are moved to the Validator.



Note: The Migration Utility > Import/Export functionality is not affected in any way by the Delete bot feature.

Bots

Extract data from a table that spans across multiple pages (Service Cloud case ID: 00371795)

IQ Bot On-Premises and Cloud

IQ Bot can now extract data successfully from an entire table that spans across multiple pages and has a table header only on the first page.

Add fields and field alias to custom domain (Service Cloud case ID: 00471075)

IQ Bot On-Premises and Cloud

You can now add additional fields (form or table) and field aliases to a custom domain for an existing learning instance.

Alert for successful or pending document validations

IQ Bot On-Premises and Cloud

Document validation status is now displayed on the Learning instances page. A green icon is used for all successful document validations, and a red icon shows any pending validations.

Changed features

Import custom domains from the staging to the production server in any order (Service Cloud case ID 00472445)

You can now edit and update an existing custom domain multiple times and import them to the production server multiple times, and in any order, before importing the learning instances. After importing the learning instances, the system classifies all documents in the production server correctly, allowing for successful processing of documents.

[Custom Domain in IQ Bot](#)

Changed features	
Validator enhancements (Service Cloud case ID: 00470258)	
Some of the Validator enhancements are as follows:	
You can now hide the Skip to next file and Mark as Invalid options using configuration settings. The options are currently enabled by default.	
To enable the option to hide them, contact Automation Anywhere Support.	
You can now hide the Hide successful fields and Hide optional fields options using configuration settings. The options are enabled by default.	
To enable the option to hide them, contact Automation Anywhere Support.	
 Note: Selecting the Hide successful fields and Hide optional fields check boxes hides all the valid fields and reduces the display of a large number of fields, thus making correction easier. However, if there is an invalid field, it continues to be displayed because the invalid field requires correction.	
- Clicking in any column field expands the column width to accommodate the text entry. The Validator shows the value of the field that is being validated, in the document. - Draw an area around single or multiple values in the document image to automatically populate a field in the Validator. This function is similar to the Designer.	

Fixed features	
Service Cloud case ID	Description
00552830	You can now use the unique validation link to access the documents without any errors.
-	When you use table extraction from a document with multiple tables, the data from the specified table is now extracted correctly.
00551886	Unicode issue with table validation for Asian languages is now resolved.
00538480	The Options method is now disabled for HTTP requests.
00538480	Cross origin resource sharing is now restricted in IQ Bot A2019.
00421067	The activities time stamp is now captured correctly in the Enterprise Control Room Audit Logs tab.
00522817	The TestRun output of a custom logic now displays the characters without any distortion, irrespective of the language you select.
00605420, 00605741, 00606561	After upgrading to IQ Bot Cloud if you restart the Enterprise Control Room, you can now view or create learning instances immediately without restarting the IQ Bot service.

Known limitations
IQ Bot On-Premises and Cloud If you create a learning instance and click Learning instances > Edit, a blank page is displayed. Workaround: Clear your browser cache and try to edit the learning instances.
IQ Bot On-Premises and Cloud If you log in to the Enterprise Control Room as an IQ Bot administrator, a 502 <code>system error</code> is displayed when you click the IQ Bot tab in the navigation bar.
IQ Bot On-Premises and Cloud You can view the <code>ValidatorURL</code> error message for a validated document along with the corrected field in the <code>.csv</code> output file.
IQ Bot On-Premises and Cloud In Internet Explorer, you cannot save a document or mark it as invalid in the learning instances validator screen. Workaround: Use the Google Chrome browser to access the learning instances validator screen.
IQ Bot Community Edition If you remove a bot (Delete a bot) associated with the document from the staging environment, you must create a group before uploading this document to the production environment. However, after deleting the bot from the staging environment, you cannot create or edit the group when you upload the same document to the production environment.

Bot Insight A2019

New features
Line Bar Chart widget available Enterprise A2019 The Line Bar Chart widget enables you to view and analyze information about your metrics and attributes. You can input two metrics and one attribute and display a bar graph when only one attribute is selected or display a clustered graph when two or more attributes are selected. You can use Date types as interval options, grouped by Day, Week, Month, and Year. Bot Insight visualizations on page 1334
Advanced settings for a query Enterprise A2019 You can use the Advanced Settings option to configure more of your queries when you create a new widget. You can now set limits to your attribute values as grouped by 10, 20, 50, and 100 values. You can also sort your data by ascending or descending order. Configuring a Line Bar Chart query on page 1335

Enterprise A2019.13 Release Notes

Release date: 15 June 2020

Review the new features, supported packages, changed features, fixed features, and known limitations in the Enterprise A2019.13 release. There are no security fixes in this release.

A2019.13 Build 4701 is available for Enterprise Cloud customers, and Build 4705 is available for Enterprise On-Premises customers. Community Edition remains on A2019.12 and will get upgraded to A2019.14 upon availability.

- [Enterprise A2019](#) on page 129
- [IQ Bot A2019](#) on page 137
- [Bot Insight A2019](#) on page 140

Enterprise A2019

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Migration from 11.x and 10.x to A2019 (currently available only to those in the Migration Early Adopter Program) Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program or a timeline for when migration will be available to all customers, contact your Automation Anywhere representative. • The Insert work item command, WLM queues, and device pools are now migrated to A2019. • Schedules are migrated when you copy 10.x data to A2019 or update 11.x data to A2019. You then have to remap some dependencies to enable the migrated schedules. Enable schedules after migration on page 504 • Additional support is provided for packages and variables. Package mapping for migration on page 453 Variable mapping for migration on page 482
Use Automation Anywhere Mobile for Enterprise A2019 Manage bots, view real-time data visualizations in operational and business dashboards, and upload documents for IQ Bot processing through the Automation Anywhere Mobile app. Automation Anywhere Mobile supports touch ID login. Automation Anywhere Mobile app on page 276
Record tasks with a device display setting of 125% or 150% You can now record tasks using Universal Recorder in Java, Microsoft Active Accessibility, and Microsoft UI automation applications on a computer that has a device display setting configured at 125% or 150%, in addition to the existing setting of 100%.

New features
Export bots without enabling SMTP in Bot Lifecycle Management When you export a bot, you can now download the exported package even when SMTP is not enabled. The link to download the exported package is available in the ACTIVITY > Historical page. Export bots on page 1162
Export and import files using BLM APIs Use the Bot Lifecycle Management (BLM) export and import APIs to move bots from one environment to another based on your organization's automation requirements. You can export bots with dependent files and command packages from the public workspace of one Enterprise Control Room and import them to a private workspace in another Enterprise Control Room, and check them into a public workspace. To export and import bots, you must have the Export bots, Import bots, View and Manage packages, and Check in and Check out permissions to the necessary folders and have the Bot Creator license. Bot Lifecycle Management API on page 1198
Capture scroll action and table using AISense Recorder You can now capture the scroll action in an application window and table control from a remote application when recording a task with AISense Recorder. Record a task with AISense Recorder on page 847
Form builder enhancements for interactive forms The form builder includes the following elements: • Select File: To enable file upload in the form. • Dropdown: To create a drop-down menu in the form. Create a form on page 931
Extract text from a specific area in a window Use the App Integration > Capture area action to extract text from within the captured area of a window and save it to a string variable. App Integration package on page 533
Read string variable values from a text file Use the String > Import string from text file action to read values from a text file and save them to a string variable. String package on page 794
Automate in IBM-5555 terminals using the Terminal Emulator package The TN5250E terminal type now supports the IBM-5555-C01 and D01 terminal models. Terminal Emulator package on page 808
Specify events within email trigger For email triggers, specify an event within the server type (Outlook, Email, or EWS server) to trigger a bot. Add an email trigger on page 946

New features	
Use hot key for interface trigger For interface triggers, you can select hot key as one of the conditions to trigger the bot Add an interface trigger on page 949	
Assign action in interactive forms package The interactive forms package now includes an Assign action that you can use to assign values dynamically in the Dropdown element of a form. Interactive forms package on page 665	
Create a shortcut of a file or folder Use the Folder > Create shortcut or File > Create shortcut action to create a shortcut in the specified destination file path. The shortcut is dependent on the source file or folder. If you make changes to the source file or folder, the changes will also apply to the shortcut. File package on page 627 Folder package on page 633	
New conditions in the If and Loop packages • Use the Data table > Data table is empty condition to execute actions based on whether the specified table contains values. • Use the Data table > Number of columns and Data table > Number of rows conditions to execute actions based on whether the number of columns or rows is Equal to, Greater than, or Less than the specified value. If package on page 656 Loop package on page 687	
Generate a random string of a user-specified number of characters and assign it to a string variable Use the String > Random action to generate a string of uppercase and lowercase alphanumeric characters. You can specify the number of characters that the generated string consists of, with a maximum of 300 characters. String package on page 794	
Upgrading Enterprise A2019 enables pre-filling installation parameters If you are upgrading from one Enterprise A2019 version to another, you have the option to pre-fill the installation parameters with existing installation content. Existing installation parameters include, for example, the installation path, HTTPS ports, database names, IP addresses, and TLS configuration. The username and password have to be manually entered. Note that this is applicable only to a Windows-based installation. Run Enterprise Control Room installer on page 331 Installing Enterprise Control Room on Linux on page 359	

Supported packages	
Package	Version
Node Manager	7.1.5207
Application	2.0.0-20200515-071407
App Integration	1.0.0-20200515-071406

Supported packages	
Package	Version
Analyze	2.2.2-20200515-101604
Boolean	2.0.0-20200515-071408
Bot Migration	2.4.0-20200604-174031
Browser	2.0.0-20200515-071410
Clipboard	2.0.0-20200515-071418
Comment	2.0.0-20200515-071418
CSV/TXT	2.0.0-20200515-071419
Database	2.0.0-20200515-071421
Data Table	2.0.0-20200515-071731
Datetime	2.0.0-20200515-071424
Delay	2.1.0-20200515-071425
Dictionary	2.0.0-20200418-005349
Run DLL	2.0.0-20200515-071713
Email	2.0.0-20200515-071427
Error handler	2.0.0-20200515-071432
Excel basic	2.0.0-20200515-071623
Excel advanced	4.0.0-20200604-173722
File	2.1.0-20200515-071434
File & folders	2.0.0-20200317-030352
Folder	2.1.0-20200515-071436
FTP / SFTP	2.0.0-20200515-071439
IF/ELSE	2.0.0-20200515-071441
Image Recognition	2.0.0-20200515-071454
Interactive forms	2.12.0-20200420-084203
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20200515-071459
Simulate keystrokes	2.0.0-20200515-071502
Legacy Automation	2.0.0-20200515-133330
	1.0.0-20200515-133334
List	2.0.0-20200515-071509
Log To File	2.0.0-20200515-071509
Loop	2.0.0-20200515-071511
Message Box	2.0.0-20200515-071511

Supported packages	
Package	Version
Mouse	2.0.0-20200515-071517
Number	2.0.0-20200515-071522
OCR	2.1.0-20200516-083309
Office 365 Excel	2.0.0-20200515-071608
Office 365 Calendar	2.0.0-20200515-071414
Office 365 OneDrive	2.0.0-20200515-071614
PDF	2.1.0-20200515-071618
PGP	2.1.0-20200515-071620
Ping	2.0.0-20200515-071621
Printer	2.0.0-20200515-071626
Play Sound	2.0.0-20200515-071622
Prompt	2.0.0-20200515-071627
Python Script	2.0.0-20200515-071628
Recorder	2.0.5-20200523-020302
REST Web Service	2.0.0-20200515-071712
SAP	2.1.0-20200515-071715
Screen	2.0.0-20200515-071718
SNMP	2.0.0-20200515-071720
SOAP Web Service	3.0.0-20200515-071723
String	3.0.0-20200515-071729
System	2.0.0-20200515-071729
Task	2.0.0-20200519-082744
Terminal Emulator	2.0.0-20200515-071735
Trigger Email	1.1.0-20200515-022805
VBScript	2.0.0-20200515-071737
Wait	3.0.0-20200515-071739
Window	2.0.0-20200515-071753
Workload	2.0.0-20200422-054201
XML	2.0.0-20200515-071743

Changed features

The Dictionary > Put action is now the Dictionary > Set value action. When you provide the key name, if the key does not already exist, this action creates a new key-value pair. In addition, you can now manually enter a value; previously, you had to select from a list of variables.

Changed features
In the Excel advanced > Get worksheet as data table action, the Tick if the first row is the header option is now the Sheet contains header option. There is no change in functionality.
The File > Rename and Folder > Rename actions now accept the full file path in the New file name and New folder name fields. Previously, these fields only accepted the new file or folder name.
When you select a file from the desktop for the JavaScript, Python Script, or VBScript packages, it is no longer necessary to isolate that file in a separate folder. Previously, when you selected a file with the Open action, all the files in that folder were selected too.
The Database > Run stored procedure action now has a different interface that enables you to configure input parameter values and output parameter data types. This action is not backward-compatible because the user interface controls and input data type have changed. You must modify the Run stored procedure action fields in the bots that contain previous versions of this action.
The Cloud License feature is now enabled by default in Enterprise A2019.

Fixed features	
Service Cloud case ID	Description
00492377, 00511639	Bots using the Image Recognition action can now recreate the recorded activity and run successfully.
00599586, 00600149, 00601142, 00599483	The <code>Processing failure</code> error encountered when using the Wait for condition action is now fixed. Bots using this action now run successfully.
00583248	During Work Item consumption, a running task is no longer canceled when the next bot is deployed.
00548456	The Workload Management v3 APIs are now successfully executed in Swagger and do not fail because of a case-sensitive issue.
00601083	For Cloud deployment, users can now successfully export bot files and download them without any errors.
00568664	The Git integration option is now displayed for admin users when they navigate to ADMINISTRATION > Settings in the Enterprise Control Room.
--	The minimum length value of a form element cannot be 0. If you set the value as 0 in Character limit > Min field, the Make field required is disabled.
00571125	When you check in a non-bot file by itself, the file is now checked in without any error. Older files that exist in Build 4111 are also unlocked and checked in after upgrading to Build 4705.
--	The form preview feature is now consistent across the Internet Explorer and Google Chrome browsers.
--	A blank page is no longer displayed when you paste content into any of the existing form elements on the form builder.

Fixed features	
Service Cloud case ID	Description
--	A form that is linked to a bot through the Display action of interactive forms is now displayed in front of all other windows when the Always display form window in front option is selected.
--	When a user login failed due to a Global Catalog (GC) availability issue, the response only indicated a communication error. The process now checks for errors and exceptions in the GC and processes the authentication with appropriate messages, so users can take appropriate action.
00520394	The VBScript package actions now support Unicode characters.
00536881	When you delete a bot, any trigger that is associated with it is also deleted and is not listed in the Activity list page.
00506169	You can now use the interface trigger to run a bot without any errors in the Japanese operating system.
00537640, 00538369	When you check out a bot from the Enterprise Control Room and add a trigger, you can now use Run with triggers to run this bot without any errors.
00531912	JavaScript package actions can now be used to parse the values in a list.
00475183	Double-byte characters returned unreadable ANSI characters in the bot Log To File text. This issue is now fixed and ANSI encoding takes the system default charset.
00475129	You can now use double-byte characters in a variable name.
00511675	The Excel advanced > Find action now searches for values in merged cells when the By rows search option is used.
00468103, 00475142	Bot names using Unicode characters, such as German umlaut, Japanese characters, and others, display correctly in the pop-up window at runtime.
00552701, 00558919	You can now select multiple actions from the Bot editor and drag them into a Step, Loop, or If action.
00507240	Fixed an issue where a running parent bot could not be stopped after it ran a child bot. Now you can stop a bot at any time.
00482810	VBScript actions can now run scripts that contain Unicode characters.
00472684, 00541922, 00551632, 00534508, 00570602	The Email > Send action now supports a user-input port number for sending emails from an SMTP server, such as AWS Simple Email Service. Previously, the action only used port 25, even if the user entered a different port number.
00475230	Fixed an issue where the String > Replace action did not support an empty string in the Replace with field. You can now use the action to replace a specific string with an empty string.

Fixed features	
Service Cloud case ID	Description
00472665	When a child bot shows an error, the parent bot now handles the exception by running the Error Handler > Catch action. Previously, the parent bot was also showing an error, even when it contained Error handler actions.
00566476, 00560339	Fixed an issue where bots that contain the Capture action stopped working when running the action during deployment, or they could not be checked out after they were checked-in for editing.
00537139	A bot running the Capture action can now capture specific objects from a Google Chrome browser on a device running the Windows 10 operating system. In some cases, bots running the Capture action from Version A2019.11 On-Premises could only capture the entire browser window.
00421864	The Create a bot screen now displays properly in Internet Explorer. Previously, some display issues occurred where the screen was cut on the right side and the screen could not be moved.
00584341	Fixed an issue where some of the historical activity entries were incorrectly displayed. These entries are now displayed correctly when a user drills down for more information.

Known limitations
When you create a Dictionary/Table variable and use it in the <code>name</code> field of the PROPERTIES control, the bot does not deploy successfully. This issue occurs because Dictionary/Table variables are not supported for the <code>name</code> field in the PROPERTIES control. You can pull the <code>name</code> value into a String or Number variable before using it in the PROPERTIES control, and then use that String or Number variable in it.
You can use Swagger to export bots but not to download exported bots. You have to use the REST Client to download exported bots.
When you run a bot, the runtime window is minimized after you preset the desktop.
The OSS Disclosure report provided in the A2019 installer is outdated. Starting from this release, you can log in to Automation Anywhere Support site and download the updated report: A-People Downloads page (Login required) .
When you capture a table control from an application using the AISense Recorder, you cannot set text using the Set text option from the Actions list. You can set text in the table by capturing a cell from the table as a text box and then using the Set text option from the Actions list.
When upgrading from one Enterprise A2019 version to another, you have the option to pre-fill the installation parameters with existing installation content, but only if you used the default installation path <code>C:\Program Files</code> .
 Note: This is applicable only to a Windows-based installation.

Known limitations
Based on the permission assigned by an administrator, users can only view the Public tab that lists the available forms and bots. However, users can edit an available form or bot by replacing View with Edit in the Enterprise Control Room URL.
When you create a bot and link a form to it, the bot is included only when you check in the form; it is not available on form check-out.
When you click multiple icons (Copy, Cut, and Paste) at the top of the form builder or bot creator page, the tooltips overlap.
Issues in the form builder: - If you drag any form element into a specific position on the form builder, it always appears at the bottom of the available elements. - If you drag form elements around in the form builder screen in Internet Explorer, the mouse pointer flickers continuously. - For the Radio button element, you cannot set the default selection in Advance behaviors. - For the Checkbox element, changes made to the check box names in the Checkbox content field are not updated when you enable Advance behaviors > Make default selections.
When a bot runs Terminal Emulator package actions in an IBM-5555 terminal, the terminal window does not display double-byte characters, including Chinese and Japanese characters.
If you used the Universal Recorder to capture a menu item from a Microsoft Active Accessibility application on a computer that has a display scale setting configured to 100%, at runtime the bot does not click the correct menu item on a computer that has a display scale setting configured to 125% or 150%.
During GUID provisioning, License Sync is called internally after a successful installation. If the internal License Sync fails but the installation is successful, users can log in and continue to work.
When a task that consists of one or more subtasks is run, the In Progress entry for the task is placed into a historical report upon completion of the first subtask, not the entire governing task.
An error occurs if the parent bot contains actions for objects captured using the AISense Recorder and the child bot contains actions for objects captured using the Universal Recorder, or vice versa.

IQ Bot A2019

The IQ Bot On-Premises version supports all the features and functionality available in IQ Bot Version 11.3.4.2.

[IQ Bot A2019 feature comparison matrix](#) on page 234

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

The IQ Bot Cloud version is available for this release and supports all features and functionality available in IQ Bot Version 11.3.4.2. This version provides users with automatic provisioning for up to three environments such as Development, Test, and Production. Users can migrate learning instances between environments using APIs.

For the Custom Logic feature, there is an identified list of Python libraries and packages that are safe to use for IQ Bot A2019 Cloud. Use only these packages to ensure security for your cloud infrastructure, file systems, databases, and network resources.

[List of Pandas Libraries which are supported and not supported on A2019 IQ Bot \(A-People login required\)](#)

New features	
Migrate data to a unified database	
IQ Bot A2019 On-Premises and Cloud	
The Database Migration Assistant enables you to migrate data from IQ Bot Version 6.5 or later databases to a unified database in IQ Bot A2019.	
Migrate earlier IQ Bot versions to IQ Bot A2019 On-Premises on page 512	
Support for custom validation Python scripts	
IQ Bot A2019 Cloud	
You can use custom logic in Python to modify intermediate extracted data in IQ Bot A2019.	
Add custom logic in IQ Bot to improve extraction	
Select an OCR engine when creating a learning instance	
IQ Bot A2019 On-Premises and Cloud	
You can select different OCR engines directly from the UI based on your requirements for data extraction from specific document types, when creating a new learning instance. You do not have to stop and restart IQ Bot services for implementing the engine change.	
Select an OCR engine	
Enable or disable PDFBox option	
IQ Bot A2019 On-Premises and Cloud	
You can enable or disable the My PDF documents do not have images check box directly in the UI when creating a learning instance.	
Disable PDFBox option	

Changed feature
The draw box icon for document values is no longer available. However, you can still click and drag a box on the document to draw boxes for the labels along with the values.

Fixed features	
Service Cloud case ID	Description
--	A new REST API is now available that contains the IQ Bot validator URLs of all the available documents that are not locked by any users. A validator URL retrieved from the REST API can be used in any browser to navigate directly to that specific document.
00343034	You are now redirected to a specific document using the validator URL after a successful login.

Fixed features	
Service Cloud case ID	Description
00471068, 00339407	The draw box functionality for field labels now ensures that the selected value is treated as an entire word rather than distinct characters. You can now select multiple system identified regions (SIRs) or a specific part of a single SIR from a field label, which enables accurate data extraction.
--	The PDF Box feature now enables you to generate an SIR for a PDF file that contains content in multiple formats.
00481720	The Service account user password can now include special characters. The service account will not be locked and all the IQ Bot services will start successfully after an installation, irrespective of whether the password has special characters.
00510286, 00548393	When the Automation Anywhere Cognitive Application service restarts after installing IQ Bot A2019 Build 4705, the user login information is now captured without any duplication. However, if you upgrade from any earlier version of IQ Bot A2019 to IQ Bot A2019.13 (Build 4705), you must deregister and register IQ Bot services.
00522978	When you now install IQ Bot, the user account is not locked even when the password has special characters, and all the IQ Bot services start without any issues.
00581425, 00581949, 00604394, 00602630	You can now register IQ Bot with child tenant using API, which enables you to view all the available domains and learning instances.
00575939, 00417631, 00423076	The .csv file is now displayed in the Output folder when you upload a document with a long filename (more than 60 characters) using IQ Bot Upload.

Known limitations
IQ Bot On-Premises The OSS Disclosure report provided in the IQ Bot A2019 installer is outdated. Starting from this release, you can go to Automation Anywhere support site to download the updated report: A-People Downloads page (Login required).
IQ Bot On-Premises and Cloud Images on the Designer in IQ Bot appear distorted while scrolling in Internet Explorer.
IQ Bot On-Premises and Cloud Installation errors are displayed for the Database Migration Assistant. Workaround: Install the <code>MsSqlCmdLnUtils</code> utility and <code>Microsoft ODBC Driver 17 for SQL Server</code> before installing the Database Migration Assistant.
IQ Bot On-Premises and Cloud Logs are not captured if the Database Migration Assistant installation fails.

Known limitations
IQ Bot Cloud System suggestions are not updated when documents are validated by the user. Workaround: Users must update the correction manually in the validator for IQ Bot Cloud if the system suggestions are not displayed.

Bot Insight A2019

New features
Compare mode widget filter The Bot Insight compare mode introduces widget filters that you can apply to your existing dashboards. A new Filter option shows a Filter window with the Attributes, Numeric, and Time widgets. Comparing dashboards on page 1327
Hourly support for widgets The Bot Insight widgets include an Hour interval option in the Group By field for Date type. The analytics for this widget groups your data by hourly intervals and displays the chart accordingly. Using widgets on page 1332

Changed features
Power BI connector You can access the AABotInsightV3.mez data connector file from C:\Program Files\Automation Anywhere\Enterprise\Connectors\PowerBI and copy it to C:\Users\<your user>\Documents\PowerBI Desktop\Custom Connectors to deploy the Power BI connector. Deploy Power BI connector on page 1338
Bot Insight APIs • All of the parameters are now optional. • The botname parameter in the Get task log data API supports multiple bot names, separated with a comma. • There are no time period limitations now on the data retrieved. Bot Insight API on page 1190

Enterprise A2019.12 Release Notes

Release date: 18 May 2020

Review the new features, supported packages, changed features, fixed features, and known limitations in the Enterprise A2019.12 (Build 4111) release. IQ Bot A2019 Build 4088 is compatible with Enterprise A2019.12 Build 4111. There are no security fixes in this release.

- [Enterprise A2019](#)
- [IQ Bot A2019](#)
- [Bot Insight A2019](#)

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Migration from 11.x and 10.x TaskBots and MetaBots to A2019 (currently available only to those in the Migration Early Adopter Program) Enterprise A2019 Migration to Enterprise A2019 is currently only available to select customers through our Migration Early Adopter Program. If you are interested in learning more about this program and requirements, please contact your Automation Anywhere representative. • Migrate TaskBots and MetaBots created in 10.x to Enterprise A2019. Migrate Enterprise bots on page 495 • The summary report generated by the Bot Scanner now provides information about the number of bots that can or cannot be migrated to A2019. Analyze reports on page 449 • (11.x only) Additional support is provided for packages and variables. Package mapping for migration on page 453 Variable mapping for migration on page 482 • (11.x only) Migration APIs enable you to migrate a single 11.x bot or entire folders of bots to A2019. Use the Repository Management API to identify bots and folders for migration. Migration APIs on page 1224 Repository Management APIs on page 1245
Integrate Enterprise Control Room with a remote Git repository Enterprise A2019 Integrate the Enterprise Control Room with remote Git repositories to manage bot version controls, and back up and restore bots and the dependent files. The integration ensures one-to-one mapping of bots between the Enterprise Control Room and the remote Git file structure. When you perform a bot check-in, a Git commit is performed at the remote Git host. Integrating Enterprise Control Room with Git repositories on page 1139

New features
Additional actions in the Interactive forms package Enterprise A2019 and Community Edition The Interactive forms package includes the following actions: • Set focus: Sets the focus on the selected form element. • Highlight: Highlights the selected element of a form. • Unhighlight: Removes the highlight from the selected element of a form. Interactive forms package on page 665
Form builder enhancements for interactive forms Enterprise A2019 and Community Edition The form builder includes the following elements: • Document: Use this element to render an image (.jpg) or PDF file along with the form. • Password: Use this element for a field that requires masking of the input data. Create a form on page 931
Run Task Bot option for attended Bot Runner (Service Cloud case ID: 00453797) Enterprise A2019 and Community Edition If the default device is mapped to the Bot agent, a user with an attended Bot Runner license in the Enterprise Control Room can now use the Run Task Bot option from the bot context menu (vertical ellipsis) to run the bot. Considerations for running a bot on page 857
New features in Universal Recorder and actions that use the recorder feature Enterprise A2019 and Community Edition • Secure recording mode ensures that sensitive data is not stored in the bots. When secure recording mode is enabled, the bots do not capture application images or values. Actions in the Image Recognition, Mouse, OCR, Screen, and Recorder packages support this feature. • JRE 6 is supported on both 32-bit and 64-bit systems. • After you capture an object, you are returned to the window containing the Bot editor. Actions in the Image Recognition, Mouse, OCR, Screen, and Recorder packages support this feature. Recording tasks in applications that run on JRE 6 on page 846 Secure recording mode on page 846
Insert a work item action Enterprise A2019 and Community Edition The Insert work item action provides you the flexibility to insert a work item from an existing queue to another queue as part of the bot execution. You can orchestrate multiple bots, enabling optimal device utilization through the queueing mechanism of workload management. Workload package on page 831

New features
View error details of a work item Enterprise A2019 and Community Edition You can view the reason for a workload automation failure in the new Error section on the View work item details page. View work items on page 1094
Extract text from windows Enterprise A2019 and Community Edition Use the Capture text of window action to extract text from a window and save it to a string variable. You can capture text from UNIX shells and Windows applications. App Integration package on page 533
Store string values securely in a credential variable Enterprise A2019 and Community Edition Configure a credential variable to hold a user-provided value or a credential from the Credential Vault. A credential variable cannot be converted to another data type, and the value cannot be displayed in a message box or written to a file. User-defined variables: Credential
Preload packages for improved bot performance Enterprise A2019 and Community Edition Preload packages on your local device to shorten the bot runtime. When you preload packages used in a bot, the system skips the package download process at bot runtime, thereby improving the bot performance. Preload packages on page 859
New features in the If and Loop packages Enterprise A2019 and Community Edition • Execute actions based on whether the value of the source datetime variable is Equal to or Not Equal to, or is Greater than or Equal to, or is Lesser than or Equal to the value of the target datetime variable. • Execute actions on migrated bots based on whether Web control exists or is active. • Configure a Loop action with multiple conditions. Specify whether all or either of the conditions must be met. If package on page 656 Loop package on page 687
Run a bot by inserting a file variable in the Run action Enterprise A2019 and Community Edition The Task Bot > Run action now supports a file variable input in the Task Bot to run field.

New features
Configure a table variable using the Assign action in Data Table package Enterprise A2019 and Community Edition You can use this action to manually enter values, assign column names, specify the column data type (string, number, datetime, or Boolean), and move columns and rows. Data Table package on page 549
Configure Wait package actions to terminate a running bot if a condition is unsatisfied Enterprise A2019 and Community Edition Select the Throw an exception option in the Wait for screen change and Wait for window actions to show an error message and terminate a bot if the screen does not change or the window does not open or close within the specified amount of time. Using Wait for screen change action on page 825 Using Wait for window action on page 826
Email trigger for new emails Enterprise A2019 and Community Edition Use email triggers to start a bot when a new email message is received in the specified email service. Supported email services are: • Microsoft Outlook • Email Server • EWS Server Add an email trigger on page 946
Generate a random integer from a user-specified range and assign it to a number variable Enterprise A2019 and Community Edition Use the Random action from the Number package to generate an integer in the range of -9,223,372,036,854,775,808 through 9,223,372,036,854,775,807. Random number action
Enterprise A2019 Bot agent OS support Enterprise A2019 Enterprise A2019 Bot agent is now supported for single users on Windows Server 2019, Windows Server 2016, Windows Server 2012, Windows 8, and Windows 7 SP1. Bot agent compatibility on page 403
Return the Bot agent installation path using the system variable AAIInstallationPath Enterprise A2019 and Community Edition
Copy and paste actions and triggers between bots (Service Cloud case ID: 00455116) Enterprise A2019 and Community Edition Use the Copy to shared clipboard and Paste from shared clipboard icons at the top of the Bot editor to duplicate actions, triggers, and metadata at a time.

New features
GDPR self-reporting Enterprise A2019 and Community Edition General Data Protection Regulation self-reporting enables the Enterprise Control Room administrator to run reports that include the following data elements (sensitive data will be masked in the output): • User Bot Runner device access. • User data in associated credential vault. • Devices registered by the user. • All documents (artifacts) uploaded or updated to public or private repositories by the user. • All bots associated to the user. • Bot Insight dashboard report includes a list of all dashboards associated to this user ID.

Supported packages	
Package	Version
Node Manager	6.5.4738
Application	2.0.0-20200418-005328
App Integration	1.0.0-20200418-005326
Analyze	2.2.1-20200314-193039
Boolean	2.0.0-20200418-005329
Bot Migration	2.3.0-20200424-015945
Browser	2.0.0-20200418-005330
Clipboard	2.0.0-20200418-005342
Comment	2.0.0-20200418-005342
CSV/TXT	2.0.0-20200418-005342
Database	2.0.0-20200418-005345
Data Table	2.0.0-20200418-005637
Datetime	2.0.0-20200418-005348
Delay	2.1.0-20200418-005348
Dictionary	2.0.0-20200418-005349
Run DLL	2.0.0-20200418-005620
Email	2.0.0-20200418-005352
Error handler	2.0.0-20200418-005357
Excel basic	2.0.0-20200422-000204
Excel advanced	2.0.0-20200422-000103
File	2.0.0-20200418-005358
File & folders	2.0.0-20200317-030352

Supported packages	
Package	Version
Folder	2.0.0-20200418-005400
FTP / SFTP	2.0.0-20200418-005404
IF/ELSE	2.0.0-20200418-005406
Image Recognition	2.0.0-20200420-104210
Interactive forms	2.12.0-20200420-084203
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20200418-005413
Simulate keystrokes	2.0.0-20200418-005415
Legacy Automation	1.0.0-20200422-075546
	1.0.0-20200422-075549
List	2.0.0-20200418-005422
Log To File	2.0.0-20200418-005423
Loop	2.0.0-20200418-005424
Message Box	2.0.0-20200418-005424
Mouse	2.0.0-20200418-005428
Number	2.0.0-20200418-005433
OCR	2.1.0-20200418-005434
Office 365 Excel	2.0.0-20200418-005517
Office 365 Calendar	2.0.0-20200418-005338
Office 365 OneDrive	2.0.0-20200418-005523
PDF	2.1.0-20200418-005526
PGP	2.1.0-20200418-005528
Ping	2.0.0-20200418-005529
Printer	2.0.0-20200418-005535
Play Sound	2.0.0-20200418-005530
Prompt	2.0.0-20200418-005536
Python Script	2.0.0-20200418-005537
Recorder	2.0.0-20200318-020414
REST Web Service	2.0.0-20200418-005619
SAP	2.1.0-20200418-005622
Screen	2.0.0-20200418-005625
SNMP	2.0.0-20200418-005627
SOAP Web Service	3.0.0-20200418-005630

Supported packages	
Package	Version
String	3.0.0-20200418-005635
System	2.0.0-20200418-005636
Task	2.0.0-20200417.230104-1256
Terminal Emulator	2.0.0-20200418-005641
Trigger Email	1.1.0-20200418-005652
VBScript	2.0.0-20200418-005643
Wait	3.0.0-20200418-005645
Window	2.0.0-20200418-005700
Workload	2.0.0-20200422-054201
XML	2.0.0-20200418-005650

Changed features
Build 4105 replaced with Build 4111 Build 4105 has been deprecated and replaced with Build 4111. If you have installed Build 4105 on Windows, perform a regular upgrade to get the new build. If you have installed Build 4105 on Linux, you must uninstall it and reinstall Build 4111. After you are on Build 4111, an update to Bot agent 7.0.4789 is also required. Update to latest Enterprise A2019 version on page 420
User interface changes in Excel basic and Excel advanced packages The text field titled Cell name is now Cell address in the actions from the Excel basic and Excel advanced packages.
Specify the column title in the Get cell address action in the Excel advanced package The Specific cell option is now the Based on header option, which accepts the column title as either the column heading or the default column title. Using the Get cell address action on page 622
Edit a work item without changing its status You no longer have to change the status of a new work item for editing. You can now edit work items that are in New status. Previously, you were allowed to edit the work item attribute values after changing the state of the attributes so that the edits to the work item could be saved. Edit work items on page 1095
Mark work items for reprocessing The Ready to run action is now updated to Re-process so that you can mark work items that are in Failed, Data error, or On hold state to New status for reprocessing. View work items on page 1094 Edit queues on page 1089

Fixed features	
Service Cloud case ID	Description
00560339	You can now do a second checkout of the same bot, make updates (for example delete a command) , and check it back in. The "File Not Found" error that prevented subsequent checkouts of the same bot and data deletion not actually getting deleted has been fixed.
--	Devices running an older version of the Bot agent can now connect to A2019.12 Enterprise Control Room.
--	Secure Data Store (SDS) installation on Enterprise A2019.12 is now working.
00530388	Multiple bot updates and check-ins succeed irrespective of the Enterprise A2019 version used to import the bot. Bot check-in on Cloud deployments used to fail when the bot was imported multiple times and overwritten. This issue is now fixed.
00521691	After Excel files are extracted from a .zip file, common tasks such as renaming and deleting the Excel files failed. This issue is now fixed.
00519528	Bot Scanner version 2.0.0 now works as expected. The crash issue is now fixed.
00517040	When the Email package is used in Exchange Web Services, the action loop exited after processing 10 emails. This early exit is fixed. Now all specified emails are processed before the loop exits.
00504163	When bots are run using the Open and Close actions from the DLL package in a loop, the Bot agent window now functions correctly. The Bot agent service does not require a manual restart after a bot is run.
00494267	Actions from the DLL package can now be run inside and outside a loop.
00494273	The Create worksheet action in the Excel advanced package now supports default sheet names for all the supported languages in Enterprise A2019.
00492554	The Sort table action in the Excel advanced package now supports OS setting for the Swedish region.
00446956	The Open action in the CSV/TXT package can now read values from files encoded with UTF-8.
00503230	The SOAP Web Service action now supports responses with non-English characters.
00522147	The \$StringVar.String:trim\$ shorthand now trims leading and trailing spaces in a string when used in the Message box package.

Fixed features	
Service Cloud case ID	Description
--	You can now deploy bots on selected Bot Runner devices with the Run as option from the My bots page in an Enterprise Control Room configured on Microsoft Azure.
--	Scheduled bots now run as expected and do not get stuck in the queue in an Enterprise Control Room configured on Microsoft Azure.
--	After you capture an object in a browser or application window, the browser window containing the Bot editor is now reactivated. Previously, users had to manually return to the Bot editor. Actions in the Image Recognition, Mouse, OCR, Screen, and Recorder packages support this feature.
00475070	Exporting a report to CSV from Activity > Historical now correctly outputs the data.
00516331	You can now build a bot that contains more than one Database > Read from action that is followed by a Loop action, within the same database session. Each time the bot runs the Read from action, the query results are refreshed, and the loop will only iterate on the current results.
00509735	Auto Login now works when you deploy a bot as an unattended Bot Runner on a Horizon Virtual Desktop Infrastructure (VDI) session.
00509831	Prompt package actions now support long inputs. The user interface displays up to 512 characters. If the input is longer than 512 characters, the rest appear as a tooltip when the user hovers over the prompt box.
00518566	You can now use the recorder feature within actions to select window titles and file paths on a device that has proxy authentication enabled. Previously, users had to manually enter this information because they could not access the device through actions while building a bot.
00475107	The Japanese language now supports column names when using CSV-related actions.
00532894 00532253 00539241	When you reimport a bot using exported files from a different Enterprise Control Room of the same version (from version A2019.12 onward) and choose to overwrite the bot, you can now check-in that bot. The error generated when you choose the overwrite option that prevented check-in of the reimported bot is now fixed only for version A2019.12 onward. Reimporting bots on A2019.11 and older releases are not supported at this time.
00521222, 00525635, 00529274, 00526613, 00526489, 00530609, 00530787, 00533445, 00535366, 00530900, 00538070	The progress of a TaskBot is not stalled at line 0 and does not remain in queue to run when you deploy the bot on a Bot Runner. The status of the device reflects Yet to Be Determined until the device is available to process the items.

Fixed features	
Service Cloud case ID	Description
00421195	You can now create a work queue by providing details such as the queue name, queue owners, participants, consumers, and work item structure. This feature is available from Workload > Queues > Create Queue.
00533465	When you delete any action from an existing bot, the corresponding metadata for the deleted action is now removed from the bot.

Known limitations
If you are running A2019.12 Enterprise On-Premises with build 4105 on Linux and want to use Build 4111, then you must uninstall Build 4105 and do a fresh installation of Build 4111. You cannot perform an upgrade to get Build 4111. See Uninstall Enterprise A2019 On-Premises from Linux server on page 365. A2019.12 Enterprise On-Premises on Windows can be upgraded as normal.
The Send reset password email functionality (from the Administration > User page) to help users reset their password is not working and returns a 401 error. Users should use the "Forgot password?" flow to reset their password.
Folders created using the Folder > Create action cannot have names that contain system actions or device references such as AUX, CON, LPT, NUL, and PRN.
Mouse click with key combo for preset triggers in SAP application is currently not supported.
The following are known limitations in the form builder: • If the character limit is set to 0 and the field is marked necessary for the Password element in a form, an error message is displayed when you run the bot. • An invalid file path associated with the Document element in a form displays an error message when the Get and Set actions of the interactive forms are used. • A blank page is displayed on the form builder when you paste content into any of the existing form elements. • A form that is linked to a bot through the Display action of interactive forms is displayed in front of all other windows, even when the Always display form window in front option is not selected.
Cloud-enabled deployments only support local authentication.
Linux is not supported for Cloud-enabled On-Premises installations.
• Work items might be queued on the View queues page as the number of devices in the device pool increase. This should not affect the bot execution because the queues are cleared when the work items are processed. • You cannot simultaneously insert work items from multiple devices in a queue. • You cannot create a draft queue. • When you insert a number value using the Insert work item to a queue, the system shows an incorrect value. For example, if you insert 023456789, the system shows 2.3456789E7. • When you add more devices to a device pool that is processing WLM automations, the newly added devices might not immediately pick up the pending work items. Workaround: Pause and resume the WLM automation.

Known limitations
If a device goes idle while processing workload management work items in a device pool, it will not process the work items. However, those work items can be processed by other devices in the pool.
When you create a form with using the "Document" element and give an incomplete file path, your bot will not run successfully.
When you create a form and specify that a password is required, the password length can be set to 0.

IQ Bot A2019 (Build 4088)

Enterprise A2019.12 Build 4111 is compatible with IQ Bot A2019 (Build 4088).

The IQ Bot On-Premises version supports all the features and functionality available in IQ Bot Version 6.5.2.

[IQ Bot feature comparison matrix](#)

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Automation Anywhere Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

The IQ Bot Cloud version is available for this release and supports all features and functionality available in IQ Bot Version 6.5.2. This version provides users with automatic provisioning for up to three environments such as Development, Test, and Production. Users can migrate learning instances between environments using APIs.

The IQ Bot Community Edition and the free trial version are available for this release. Both versions have feature parity and are based on IQ Bot Version 6.5.2.

Known limitations
IQ Bot On-Premises IQ Bot registration is not supported for Cloud-enabled On-Premises installations.

Bot Insight

New features
View filtered data of the dashboard widgets Enterprise A2019 and Community Edition The Bot Insight dashboard widget filter enables you to apply filters across the widgets in the dashboard to display filtered data. While the dashboard filters enable you to view different combinations of information from a single dashboard, the widget filters enable you to drill down to information from the already filtered data. You can also save and publish the custom dashboards with the preset widget filters. Bot Insight dashboard filter on page 1325

New features
Retrieve information from the Bot Insight API, and generate and visualize data analytics on Microsoft Power BI Enterprise A2019 and Community Edition The Automation Anywhere custom connector enables you to establish a secure connection to Microsoft Power BI, and generate and visualize data analytics. You can select the Bot Insight APIs in Microsoft Power BI and apply specific parameters for each of the APIs. The custom connector transforms the Bot Insight API responses to data model visualizations in Microsoft Power BI. Data connector for Power BI on page 1337
Preview and analyze business information in the default business dashboard Enterprise A2019 and Community Edition The Data Preview menu in the Bot Insight default business dashboard displays information that is logged for multiple Analyze Open and Close commands used in the bot. The Preview Data menu does not appear when you perform a comparison between the default dashboards.
API enhancements Enterprise A2019 The <code>deletetasklogdata</code> API is updated to include the runId parameter. The <code>getbotrundata</code> API retrieves information about the vital statistics of the bot. The <code>getaudittraildata</code> API retrieves information about the audit data that is logged for all users. Bot Insight API on page 1190

Related concepts

[Migrate to Enterprise A2019](#) on page 430

Migrate to the latest Enterprise A2019 version from Automation Anywhere Enterprise versions 11.x or 10.x.

Related tasks

[Update to latest Enterprise A2019 version](#) on page 420

If you are already using Enterprise A2019 On-Premises, you can update to the latest version of Enterprise A2019.

[Updating IQ Bot A2019](#) on page 426

Update IQ Bot A2019 On-Premises to the most recent version for all the latest features and enhancements.

Enterprise A2019.11 Release Notes

Review the new features, supported packages, changed features, fixed features, and known limitations in the Enterprise A2019.11 (Build 3337) release. There are no security fixes in this release.

- [Enterprise A2019](#)
- [IQ Bot A2019](#)
- [Bot Insight A2019](#)

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Migrate 11.x TaskBots and MetaBots to A2019 Enterprise A2019 - Additional support is provided for packages and variables. Package mapping for migration on page 453 Variable mapping for migration on page 482 - You can now migrate MetaBots (with DLLs) and their components from 11.x to A2019. You cannot migrate screen-based MetaBots. How MetaBots are migrated on page 498 - Use the Bot Scanner to analyze MetaBots to determine if they can be migrated to A2019. - Verify the list of certified 11.x bot versions available for migration: Understanding Enterprise A2019 migration on page 430
Bot Store integration with the Enterprise Control Room Enterprise A2019 You can now access the Bot Store from within the Enterprise Control Room. You can install, configure, and run the Bot Store bots within the Enterprise Control Room. As a registered user, you can log in to the Bot Store from the Enterprise Control Room and access all your downloads. You can install bots and packages from your downloads to the Enterprise Control Room private repository. You can also submit your existing bots and packages from the Enterprise Control Room to the Bot Store. Bot Store on page 1154
Use interactive forms in a bot Enterprise A2019 Interactive forms provide a form builder experience for users to build interfaces for submitting and regrouping data being used to send and receive data from various applications within their attended automation process. Users with Bot Creator and Bot Runner license can use the interactive forms package to control and manage the form flow within a bot during runtime. Actions performed by users on the interactive forms can be monitored to execute logic using subtasks. Interactive forms are first-class citizens within the bot repository and have the same workflows for moving forms between public and private workspaces, and for export or import actions. No additional licenses or permission are required to use interactive forms. Action items in the interactive forms can be used to manage various forms within a bot. Using interactive forms on page 931

New features

Reuse an identical value between bots by configuring a global value in the Enterprise Control Room

Enterprise A2019 and Community Edition

A global value enables users to reuse an identical value between bots instead of creating a new variable for each bot. Global values remain constant for all users and bots in an Enterprise Control Room instance. A user with the `AAE_admin` role can configure a global value with a default value and enable non-admin users to overwrite the value to use in their bots.

[Global values](#) on page 882 | [Create a global value](#) on page 883 | [Overwrite the default value](#) on page 883

Workload enhancements

Enterprise A2019 and Community Edition

- Monitor the progress of ongoing workload automations. You can also pause, resume, or stop the automations as required.
- Configure and edit workload automations to ensure that the automations are deployed seamlessly to unattended Bot Runner devices. Execute the workload automations with priority or round-robin mode from the Devices > Edit Device pool page.
- Set the output status of the work item processed in the Enterprise Control Room on the Queues and Work item details page using the `$workItemResult$` variable in a TaskBot.
- Edit work items that are in Ready to run, On hold, Data error, or Failed state.
- Set the individual work item status to Mark complete, Defer, or Re-process from the Edit work item page or in bulk from the View queues page.

[View automation of a queue](#) on page 1093 | [Edit device pools](#) on page 1076 | [Edit work items](#) on page 1095 | [Use Work Item variables](#) on page 877

Download a file from the Enterprise Control Room to your device

Enterprise A2019 and Community Edition

Use the Download CR file action from the File package to download a file from the Enterprise Control Room to your device.



Note: You cannot use this action to download a bot or a file from the `My Scripts` folder.

[File package](#) on page 627

New features

Clone a bot or files

Enterprise A2019 and Community Edition

Create a read-only copy of a selected bot or file from the public repository to the private repository. The clone is a local copy for the same user and will not be updated with the public repository copy automatically. This provides a testing environment experience for Bot Creators to make and validate changes locally and take advantage of reusable TaskBots in concurrent developments by reusing an existing bot or file as a dependency.

- Cloned bots and files cannot be edited, renamed, or moved.
- Cloned bots and files can be deleted from a private repository.
- Users can create a copy of the cloned bot.
- A cloned bot can be used in Run Task action in another bot.
- Cloned bots and files can be added as a manual dependency for another bot.

New features in the If package

Enterprise A2019 and Community Edition

- Configure an If action with multiple conditions.
Specify whether all or either of the conditions must be met.
- Verify whether JavaScript, Task, or VBScript ran successfully or not.
- Verify whether a string variable is empty or not.
- Execute actions only if two strings have matching uppercase and lowercase letters.

[If package](#) on page 656 | [Example of using a conditional statement](#) on page 892

Universal Recorder enhancements

Enterprise A2019 and Community Edition

Universal Recorder now enables you to:

- Automate in Java applications that run using Java Runtime Environment (JRE) 9, 10, and 11.
- Capture objects in tables in Oracle EBS applications.
- Automate interactions with user interface objects in the taskbar, desktop, or currently active window. This option is available in the window selection drop-down list in the following packages:
 - Image Recognition
 - Mouse
 - Recorder
 - Screen
 - Simulate keystrokes
 - Window

[Universal Recorder for object-based automation](#) on page 836

New features
New features in the Excel advanced package Enterprise A2019 and Community Edition • In the Replace action, you can choose to replace cell values with an empty character. • In the Get cell address action, you can choose to save the retrieved cell address to a string variable. Using the Replace action on page 621 Using the Get cell address action on page 622
Add DLL dependencies Enterprise A2019 and Community Edition As a bot creator, you can use a DLL that refers to a child DLL. Bot dependencies on page 884
Licensing server failover Enterprise A2019 HA failover from a primary cluster to a secondary cluster applies to all the servers, including the licensing server, and is handled by the data center high availability tools. Distributed architecture with HA/DR support on page 249 High availability cluster configuration on page 324
Automate locking, logging off, restarting, or shutting down the computer Enterprise A2019 and Community Edition Use actions from the System package at the end of tasks to automate locking, logging off, restarting, or shutting down the computer.
Manage running bots with the Pause and Stop actions from the Task Bot package Enterprise A2019 and Community Edition • Insert a Pause action to temporarily pause the running bot. • Insert a Stop action to terminate the running bot. Task Bot package on page 804
Automate printer settings Enterprise A2019 and Community Edition Use actions from the Printer package to automate retrieving and setting the default printer.
Return the path and name of the currently running TaskBot using the system variable AATaskName Enterprise A2019 and Community Edition System variables on page 867

New features	
Run JavaScript, Python, or VBScript from a file selected from your desktop Enterprise A2019 and Community Edition You can select the file containing the script as part of configuring the action.	
	Note: The file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded.
JavaScript package on page 680 Python Script package on page 745 VBScript package on page 823	
Device optimization for bot deployment (Zendesk ID: 238675) Enterprise A2019 and Community Edition Bot Runner devices that are used for Workload automation are now available for deployment in the Scheduled Automations page. This ensures that idle devices during a workload cycle are available to the user with scheduling rights for Enterprise Control Room deployment. Edit device pools on page 1076	

Supported packages

Package	Version
Node Manager	6.0.4015
Application	2.0.0-20200302-135910
Analyze	2.2.1-20200314-193039
Boolean	2.0.0-20200302-135912
Browser	2.0.0-20200302-135913
Clipboard	2.0.0-20200302-135922
Comment	2.0.0-20200302-135922
CSV/TXT	2.0.0-20200312-122802
Database	2.0.0-20200302-135926
Data Table	2.0.0-20200302-140308
Datetime	2.0.0-20200302-135930
Delay	2.1.0-20200302-135931
Dictionary	2.0.0-20200302-135932
Run DLL	2.0.0-20200313-170350
Email	2.0.0-20200302-135934
Error handler	2.0.0-20200302-135940
Excel basic	2.0.0-20200302-140133
Excel advanced	2.0.0-20200302-140020

Package	Version
File	2.0.0-20200316-045955
File & folders	2.0.0-20200317-030352
Folder	2.0.0-20200302-135945
FTP / SFTP	2.0.0-20200302-135948
IF/ELSE	2.0.0-20200302-135950
Image Recognition	2.0.0-20200302-135953
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20200313-170107
Simulate keystrokes	2.0.0-20200313-170111
Legacy Automation	1.0.0-20200317-220124
	1.0.0-20200317-220128
List	2.0.0-20200302-140013
Log To File	2.0.0-20200302-140014
Loop	2.0.0-20200302-140015
Message Box	2.0.0-20200302-140016
Migration	2.0.0-20200317-220133
Mouse	2.0.0-20200302-140016
Number	2.0.0-20200302-140023
OCR	2.1.0-20200302-140025
Office 365 Excel	2.0.0-20200309-140138
Office 365 Calendar	2.0.0-20200305-124125
Office 365 OneDrive	2.0.0-20200309-110128
PDF	2.1.0-20200302-140126
PGP	2.1.0-20200309-110135
Ping	2.0.0-20200302-140130
Printer	2.0.0-20200311-100204
Play Sound	2.0.0-20200309-110137
Prompt	2.0.0-20200302-140148
Python Script	2.0.0-20200313-170254
Recorder	2.0.0-20200318-020414
REST Web Service	2.0.0-20200312-090358
SAP	2.1.0-20200302-140250
Screen	2.0.0-20200302-140254
SNMP	2.0.0-20200302-140257

Package	Version
SOAP Web Service	2.0.0-20200312-110311
String	2.0.0-20200302-140306
System	2.0.0-20200309-140321
Task	2.0.0-20200317-030340
Terminal Emulator	2.0.0-20200302-140313
VBScript	2.0.0-20200313-170417
Wait	2.0.0-20200302-140319
Window	2.0.0-20200302-140348
XML	2.0.0-20200302-140321

Changed features
Change in the Dictionary > Remove action The Dictionary > Remove action offers the option to assign the removed value to a variable. Dictionary package on page 576
The Update migration status permission name has been changed to Allow a bot-runner user to run migrations. All functionalities remain the same.
When multiple bots are scheduled to run on the same user or device, the bots are now queued and run whenever the previous bots completes its run. Service Cloud case ID: 00440072 Schedule on page 1057 Workload management on page 1079

Fixed features

Service Cloud case ID	Description
00483976	When the copy function is used, nested subfolders were not visible when users clicked browse to search through directories. This issue has been fixed.
00457550	When a user checks out a bot that uses the Run action to run child bots, the child bots are now cloned from the public repository to the private.
00492706	When a user exports a bot from another Enterprise Control Room and imports that same bot to a new Enterprise Control Room, the imported bot and enabled packages now show all required actions.
00482934	Bot deployments and website launches are now optimized for quicker process.
00421864	When a user is viewing historical activity details in Historical activity, the run option is no longer displayed.

Service Cloud case ID	Description
00505120	When bots fail the check-in process, the contents are now restored in the Private repository.
00488504	Bots with more than 100 dependencies are now exported successfully without an error, even if the parent bots are in the list of those 100 dependencies.
00444902	When the Enterprise Control Room is used in Internet Explorer 11, the Bot agent is now compatible and the UI is rendered properly.
00454079	When the Capture action in the Recorder package is used, content in the browser is captured successfully.
00460530	In a developer Enterprise Control Room, a user can now successfully import a bot with cyclic dependency.
00493605	In the Run action in the TaskBot package, the Assign the output to variable (optional) option now functions properly when an assigned variable is removed.
00486734	When the Set cell action in the Excel advanced or Excel basic package is used with multiple Microsoft Excel files, the values of the Active cell operation now activate and set the cells accordingly in the respective Microsoft Excel file.
00530915	Migration is not advisable for 11.x customers using Workload Management (WLM) due to known issues.
--	You can now add date variables in the Vertical Bar Graph widget in the Bot Insight Business dashboard.
00475173	All fields of the Recorder > Capture action have been translated into Enterprise A2019 supported languages.
00476820	When a Bot Runner machine is logged off, the device shows the state as Disconnected in the Enterprise Control Room. Previously, the device showed the state as Connected in the Enterprise Control Room.

Known limitations
MetaBot logic that uses a DLL function call with one or more parameters migrates successfully. However, when you run the migrated bot, an error is shown.
Global values of the Date time data type cannot be used in actions.
The A2019 On-Premises Enterprise Control Room installation does not support the semicolon (;) special character in the Windows user password. The installation fails if you use this special character.
When data is exported into a CSV file from User Management, Audit Logs, and Roles Management for all locales except English, the respective language is not displayed correctly. Workaround: Export to a CSV file and access a Microsoft Excel file. Import and save that CSV file as a CSV with UTF-8 encoding.

Known limitations	
Users must explicitly enable the feature flag for the forms feature in the On-Premises build.	
	Note: Go to Automation Anywhere support site for more information: Interactive forms not available in A2019.11 On-Premises (A-People login required)
Forms with many radio buttons and check boxes in the same row are not rendered correctly.	
Only the Form Events and UI Triggers event types are supported by event loop as the file or folder triggers and hot keys have issues.	

IQ Bot A2019

The IQ Bot On-Premises version is available for this release with additional features or updates since the last release. This IQ Bot version supports all the features and functionality available in IQ Bot Version 6.5.2.

[IQ Bot feature comparison matrix](#)

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Automation Anywhere Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

The IQ Bot Cloud version is available for this release and supports all features and functionality available in IQ Bot Version 6.5.2. This version provides users with automatic provisioning for up to three environments such as Development, Test, and Production. Users can migrate learning instances between environments using APIs.

The IQ Bot Community Edition and the free trial version are available for this release. Both versions have feature parity and are based on IQ Bot Version 6.5.2 .

New features	
Upgrade from earlier versions of IQ Bot to the latest IQ Bot A2019 On-Premises	
IQ Bot A2019 On-Premises	
If you are using any of the earlier versions of IQ Bot (5.3.x or 6.5.x), you can upgrade to IQ Bot A2019 Build 3337 On-Premises.	
Updating IQ Bot A2019 on page 426	
Use API to migrate learning instances between environments	
You can use an API to migrate learning instances in IQ Bot A2019 On-Premises.	
Access IQ Bot A2019 from the Enterprise Control Room dashboard	
Enterprise A2019 and Community Edition	
You can access IQ Bot from the Enterprise Control Room through a link, provided you have registered IQ Bot in the Enterprise Control Room. Otherwise, the IQ Bot section remains hidden.	

Known limitations
IQ Bot On-Premises IQ Bot A2019 installation fails if the user password contains any of these special characters: single quotation mark ('), quotation mark ("), or semicolon (;).
IQ Bot Cloud • ABBYY FineReader Engine is the default OCR for data extraction in IQ Bot Cloud. • Data validation using Python script is not supported. • IQ Bot extensions for custom extraction are not available.

Bot Insight

New features
View filtered data of Bot Insight dashboards Enterprise A2019 The Bot Insight dashboard filter enables you to apply filters across dashboards to display filtered data on the dashboard widgets. The filter enables you to view different combinations of information from a single dashboard, thereby eliminating the need to maintain separate dashboards for different sets of users. Bot Insight dashboard filter on page 1325
View business analytics for multiple transactions simultaneously Enterprise A2019 The Multiple Transaction Names menu displays transactional information about bots with multiple Analyze- Open and Close commands. Each Analyze- Open and Close command is considered as a transaction, and each transaction is displayed as a unique block in the data preview section. The number of rows for each unique transaction block is limited to 100. Business dashboard on page 1322

Enterprise A2019.10 Release Notes

Review the new features, supported packages, changed features, fixed features, and known limitations in Enterprise A2019.10 (Build 2545). There are no security fixes in this release.

- [Enterprise A2019](#)
- [IQ Bot A2019](#)
- [Bot Insight A2019](#)

Enterprise A2019

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Migrate 11.3.x TaskBots to A2019 Enterprise A2019 - Analyze whether you can migrate bots created in Enterprise client version 10.x using the Bot Scanner. Analyze reports on page 449 - Additional support is provided for packages and variables. Package mapping for migration on page 453 Variable mapping for migration on page 482 - Multiple Bot Runner users are supported for bot migration. Migrate Enterprise bots on page 495
AI Sense Recorder to capture objects from remote applications This is a Beta release on Enterprise A2019 (Cloud deployment only) and Community Edition Record a task and capture objects using the AI Sense Recorder from applications that are usually accessed remotely and with a complex user interface (UI). Record a task with AI Sense Recorder on page 847
Manage your automation as Work Items for resource optimization and workload automation Enterprise A2019 and Community Edition Divide your automation into small, logical modules called Work Items using the new Workload Management feature. Process these Work Items simultaneously using queues to ensure that your organization's automation goals are achieved with optimum resource utilization. Use the workload module to create and manage workload queues and run bots on unattended Bot Runners through the workload queues. Also, pass the Work Item attributes or values to the bot from the Enterprise Control Room when you Run bot with queue with the help of Work Item variables. Workload management on page 1079
Install Enterprise Control Room on Red Hat Enterprise Linux 7.7 and Linux CentOS 7.7 Enterprise A2019 Use the command line to install your Enterprise Control Room on your Linux servers in the datacenter. Installing Enterprise Control Room on Linux on page 359
Use wildcard characters in folder and file path fields in the Encrypt and Decrypt actions Enterprise A2019 and Community Edition Substitute an asterisk (*) for one or more unknown alphanumeric characters or symbols. This maximizes the search results by returning all folders and files that contain the string that you have specified. Encrypt Decrypt

New features
Use system variables to return data from the computer that is connected to the running Bot agent Enterprise A2019 and Community Edition You can use the following system variables: • AACControlRoom: Returns the URL of the Enterprise Control Room. • CPUUsage: Returns the percentage utilization of the CPU. • RAMUsage: Returns the RAM usage in megabytes. • OSName: Returns the operating system. • TotalRAM: Returns the total amount of RAM available.
Automate tasks in Oracle EBS and Forms with the Universal Recorder Enterprise A2019 and Community Edition Open Oracle EBS applications in a browser as Java Web Start applications or as a thick client. The Universal Recorder can capture the following objects: • Window/Tab • Button • Text box • Label (read-only) • Radio button • Check box • Table/Grid • Scroll bar • Menu • Combo-box/Drop-down list

Supported packages

Package	Version
Node Manager	2.0.2885
Application	2.0.0-20200131-085947
Analyze	2.1.0-20200204-154550
Boolean	2.0.0-20200131-085949
Browser	2.0.0-20200127-180439
Clipboard	2.0.0-20200131-085958
Comment	2.0.0-20200130-183435
CSV/TXT	2.0.0-20200205-175938
Database	2.0.0-20200205-175940
Data Table	2.0.0-20200131-200235
Datetime	2.0.0-20200131-090006
Delay	2.1.0-20200131-090007

Package	Version
Dictionary	2.0.0-20200205-175946
Run DLL	2.0.0-20200205-230300
Email	2.0.0-20200206-135926
Error handler	2.0.0-20200130-183452
Excel basic	2.0.0-20200205-110122
Excel advanced	2.0.0-20200205-110012
File	2.0.0-20200131-090018
Folder	2.0.0-20200131-090021
FTP / SFTP	2.0.0-20200206-110020
IF/ELSE	2.0.0-20200131-090025
Image Recognition	2.0.0-20200131-090028
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20200205-180013
Simulate keystrokes	2.0.0-20200205-105955
List	2.0.0-20200131-090039
Log To File	2.0.0-20200131-090040
Loop	2.0.0-20200131-090041
Message Box	2.0.0-20200131-090041
Migration	1.1.0-20200206-180601
Mouse	2.0.0-20200131-090044
Number	2.0.0-20200205-110015
OCR	2.1.0-20200131-090053
Office 365 Excel	2.0.0-20200205-180122
Office 365 Calendar	2.0.0-20200206-105949
Office 365 OneDrive	2.0.0-20200127
PDF	2.1.0-20200131-090152
PGP	2.1.0-20200205-110117
Ping	2.0.0-20200131-090156
Play Sound	2.0.0-20200127-180654
Prompt	2.0.0-20200127-180707
Python Script	2.0.0-20200205-180148
Recorder	2.0.0-20200212
REST Web Service	2.0.0-20200206-110309
SAP	2.1.0-20200205-180245

Package	Version
Screen	2.0.0-20200131-090311
SNMP	2.0.0-20200207-090446
SOAP Web Service	2.0.0-20200127-180819
String	2.0.0-20200131-090323
System	2.0.0-20200205-110240
Terminal Emulator	2.0.0-20200131-090330
VBScript	2.0.0-20200205-180309
Wait	2.0.0-20200131-090335
Window	2.0.0-20200131-090337
XML	2.0.0-20200131-090339

Changed features
Updated layout for the summary report generated by Bot Scanner The layout of the summary report is updated to provide information about the number of bots scanned, and the commands and variables used in the scanned bots that are supported in A2019. Analyze reports on page 449
Python script and VBScript packages return output without quotation marks The actions in the Python script and VBScript packages now return output without any quotation marks. For example, if the action previously returned "ABC" as the output, now the action returns only ABC.
Use Microsoft SQL Server address as alias for database Service Cloud case ID: 00401484 The Enterprise Control Room now supports using a Microsoft SQL Server address as alias for a database during installation. KB article: Change database server after A2019 Control Room installation (A-People login required)

Fixed features

Service Cloud case ID	Description
00463210	In a virtual machine using Remote Desktop Protocol, the Keystrokes action now functions properly without prompting a special characters error.
00455359, 00466407, 00475122	When the Enterprise Control Room is used in Google Chrome, renaming a folder in the My bots section no longer causes the browser to crash.

Service Cloud case ID	Description
00440659	In the Data Table package, the Create folders/files if it doesn't exist option in the Write to file action now functions properly and does not create a file when the option is not selected.
00377861, 00466104	When you install Enterprise A2019 On-Premises with Amazon Relation Database Service (RDS) and there is no internet connectivity, the installation now completes successfully.
00472738, 00496476	In the Enterprise Control Room, the bot now runs successfully without prompting an interactive bot error message in any circumstance.
00472655	In the Loop action, selecting the Cell range in the Loop through option now functions properly with the For each row in worksheet in the Iterator option.
00475040	When a bot is developed in Google Chrome, the pause and resume options now function correctly.
00445671	The time taken to connect to the Enterprise Control Room is now less than 2 minutes after you restart the Enterprise Control Room services.
00421864	You can now configure your Bot agent using the Google Chrome browser. The following error message is no longer displayed: Please use Chrome to configure your bot agent.
00462095	Bot compilation time has decreased, so it takes less time for the bot to run. Previously, some bots took up to 40 seconds in pre-processing mode.

IQ Bot A2019

The IQ Bot On-Premises version is available for this release with additional features or updates since the last release. This IQ Bot version supports all the features and functionality available in IQ Bot Version 6.5.2.

[IQ Bot feature comparison matrix](#)

Review the compatibility of the IQ Bot A2019 On-Premises version with the corresponding Automation Anywhere Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

New features
IQ Bot On-Premises unified database IQ Bot Build 2545 On-Premises now supports a unified database. You have to run a migration script to migrate the databases of Builds 1089, 1598, and 2079 to Build 2545. Run IQ Bot On-Premises database migration script on page 427



Note: The version number in the IQ Bot installer is incorrect and will be fixed in the next release.

Bot Insight A2019

New features
New Bot Insight homepage The new homepage displays all the available dashboards in a single page and enables you to directly access the dashboard of your choice. The smart search functionality enables you to search for dashboards in the Search text field. The homepage also enables you to bookmark your favorite dashboards and to sort the dashboards based on the following parameters: • Dashboard Name • Type • Total Views • Last Refreshed Bot Insight dashboards on page 1318
Operations dashboard View information about the bots that are deployed on different Bot Runner machines and their statistics based on the performance from the Bot Insight Operations dashboard. You can use this information to enhance productivity and take measures based on real-time information for RPA deployments. You can directly access the Bots and Audit dashboards from the hyperlinks in the Operations dashboard. Operations dashboard on page 1320
Transaction data View data that is aggregated and logged by the bots when they are deployed in the Bot Runner machines by using the Transaction data feature in the Profile menu. You can access this feature from the Business dashboard. Business dashboard on page 1322
Exporting data from widgets Export data that is generated by the various smart widgets to comma-separated value (CSV) files on your local drive from the Custom Business dashboard. The export file for all the widgets, except the Data Table Chart and the US Map, contains the following headers: • Group • Subgroup • Metric • Volume The Data Table Chart export file contains all the headers that are present in the Data Table Chart. The US Map export file contains the state codes, metric values, and the volume headers. Exporting data from a dashboard widget on page 1337

New features

Visualization updates

Customize the widgets on the Bot Insight dashboards to gain insights for specific scenarios. The following widgets are added to Bot Insight:

- Heat Map
- Data Table Chart

[Bot Insight visualizations](#) on page 1334

Known limitations

Using the Universal Recorder in Oracle EBS applications:

- The Select item by text action does not retrieve the value of a selected ListView object.

Workaround: Manually enter the item value after capturing the object control or use the Select item by index action.



Note: Item index count starts at 1.

- At runtime, the Select item by text and Select item by index actions do not appear to select the item specified in a PageTab object, but the bot successfully executes the action.
- At runtime, the Select item by text and Select item by index actions do not appear to select the item specified in a ComboBox object, but the bot successfully executes the action.

In Enterprise A2019 On-Premises, the following activities are currently not logged in the workload logs:

- Create a queue
- Create a device pool
- Create a bot
- Run a bot with a queue

You can access the logs from the C:\ProgramData\AutomationAnywhere\Logs folder.

Related information

<https://www.automationanywhere.com/in/lp/rpa-editions-comparison>

Enterprise Version A2019 (Build 2094) Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Enterprise Version A2019 (Build 2094).

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

Version A2019 Build 2094

Build 2094 contains updates for the following:

- [Enterprise Community Edition](#)
- [Bot Insight A2019](#)
- [IQ Bot A2019](#)

- [On-Premises](#) (Build 2079)

New features in Version A2019 Build 2094

Feature	Description
Migration	Migrate 11.3.x TaskBots to A2019. • Run the Bot Scanner (previously called the pre-migration utility) to analyze if your 11.x bot (currently only 11.3.1, 11.3.2, and 11.3.2.x versions are supported) can be migrated to A2019. The utility generates a summary report in HTML format and a separate report for each bot in XML format. Bot Scanner overview on page 447 • Migrate multiple TaskBots with dependent TaskBots using a single Run-as user. Migrate Enterprise bots on page 495 • As part of the bot migration process, you can identify previously migrated TaskBots on the bot selection page and preview a list of the dependent TaskBots before finalizing the migration. Migrate Enterprise bots on page 495 • Analyze the status of individual bot migrations and identify any unsupported commands or attributes associated with the migrated bot and its dependencies. View migration reports on page 507 • Additional support is provided for packages and variables. Package mapping for migration on page 453
SAML 2.0	Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP). Set up SAML authentication on page 388

Feature	Description
Bot Deploy API	The Bot Deploy API now includes / <code>automations/deploy</code> and is introduced to support the <code>runAs user</code> feature for Bot deployment. - The Bot Deploy API works only in Enterprise public accounts, and not in Community Edition. - The API supports callback URL for environments that have both the Enterprise Control Room and callback server on the same network.
Geo Presence	The Geo Presence feature is a multi-tenant, secure, scalable, Cloud Control Room enhancement to securely communicate with users and Bot Runners over a customer network.
Exchange Web Services support	Actions in the Email package enable users to automate email-related operations using Exchange Web Services (EWS). Email package on page 584
Variables in place of an index or key value	Data table, dictionary, list, and record type variables can express index and key values as variables. Variable types on page 870
Copy bot	The copy bot functionality retains the metadata of the original bot, including captured images, recorded objects, called files, and child bots. Copy a bot on page 860
Excel actions to retrieve cell, column, or row location	The following actions enable users to retrieve location information from an Excel sheet and save it to a variable. Get cell address Get column Get row
Recorder enhancements	Users can discard the most recently captured object while the Recorder is running.

Supported packages

Package	Version
Node Manager	1.0.1891

Package	Version
Application	2.0.0-20191223-210256
Boolean	2.0.0-20191223-210258
Browser	2.0.0-20191223-210259
Clipboard	2.0.0-20191223-210308
Comment	2.0.0-20191223-210309
CSV/TXT	2.0.0-20191223-210310
Database	2.0.0-20191223-210312
DataTable	2.0.0-20191223-210802
DateTime	2.0.0-20191223-210316
Delay	2.1.0-20191223-210318
Dictionary	2.0.0-20191223-210318
DLL	2.0.0-20191223-210742
Email	2.0.0-20200114-060001
Error Handler	2.0.0-20191223-210326
Excel	2.0.0-20200107-140225
Excel_MS	2.0.0-20200107-140116
File	2.0.0-20200114-060009
Folder	2.0.0-20200114-060012
FTP/SFTP	2.0.0-20191223-210334
If/Else	2.0.0-20191223-210336
IR	2.0.0-20191223-210339
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20191223-210345
Keystrokes	2.0.0-20191223-210348
List	2.0.0-20191223-210350
LogToFile	2.0.0-20191223-210350
Loop	2.0.0-20191223-210352
MessageBox	2.0.0-20191223-210352
Migration	1.1.0-20200111-070201
Mouse	2.0.0-20191223-210355
Number	2.0.0-20191223-210402
OCR	2.1.0-20191223-210525
Office 365 Excel	2.0.0-20191231-170605
Office 365 Calendar	2.0.0-20191231-170422

Package	Version
Office 365 OneDrive	2.0.0-20191231-170612
PDF	2.1.0-20191223-210631
PGP	2.1.0-20191223-190649
Ping	2.0.0-20191223-210634
PlaySound	2.0.0-20191223-210636
Prompt	2.0.0-20191231-130717
Python	2.0.0-20191223-210644
Recorder	2.0.1-20200111-070529
Rest	2.0.0-20191231-120639
SAP	2.1.0-20191223-210745
Screen	2.0.0-20191223-210748
SNMP	2.0.0-20191223-210752
SOAP	2.0.0-20191210-081952
String	2.0.0-20200114-110316
System	2.0.0-20191223-210800
Terminal Emulator	2.0.0-20191223-210806
VBScript	2.0.0-20191223-210809
Wait	2.0.0-20191223-210812
Window	2.0.0-20191223-210814
XML	2.0.0-20191223-210815

Changed features

Feature	Description
Office 365 packages authorization	Authorize each Office 365 package separately through the Connect package in each package. Using the Connect action on page 709

Fixed features

Feature	Description
Bot agent	In the Enterprise Control Room, upgrading to the latest Bot agent version now successfully executes the bot without any prompted error messages. See Switch Bot agent to a different Enterprise Control Room on page 414.

Feature	Description
Excel advanced package	In the Excel advanced package, the Close action now terminates only a specific open session as defined by the session name.
Keystrokes	The Keystrokes command now functions properly with the Japanese keyboard layout.

Security fixes

The security fixes in this release have not changed since the previous release. For a list of these fixes, see [Enterprise Version A2019 \(Builds 1598 and 1610\) Release Notes](#) on page 176.

Deprecated features

The deprecated features in this release have not changed since the previous release. For a list of these deprecations, see [Enterprise Version A2019 \(Builds 1598 and 1610\) Release Notes](#) on page 176.

Known limitations in Build 2094

Migration

- When selecting a bot for migration, values for the Last Migrated and Migrated By columns might differ for the same bot in the Available Files and Selected tables.
- The "System" value in the Migrated By column indicates that the bot has not been migrated previously.
- When viewing commands and variables associated with each migrated bot, you should only see the unsupported commands and variables. Currently, all commands and variables are shown.

IQ Bot A2019 Build 2079

IQ Bot On-Premises version is available for this release with no additional features or updates since the last release. This version is based on IQ Bot Version 6.5.2 feature and functionality.

[IQ Bot feature comparison matrix](#)

IQ Bot A2019 On-Premises version is compatible with the corresponding Automation Anywhere Enterprise Control Room On-Premises version.

[IQ Bot A2019 version compatibility](#) on page 238

For a fresh Enterprise Control Room installation, the user has to upload the IQ Bot package manually. See [Add packages to the Enterprise Control Room](#) on page 1098 for details.

Go to Automation Anywhere support site to download the package:

[A-People Downloads page \(Login required\)](#).

IQ Bot fixed features

The fixed features in this release have not changed since the previous release.

IQ Bot security fixes

The security fixes in this release have not changed since the previous release.

IQ Bot deprecated features

The deprecated features in this release have not changed since the previous release.

IQ Bot known limitations

There are no new known limitations in this release.

Bot Insight new features in Build 2094

Feature	Description
Visualizations	The Visualization widget in the Bot Insight dashboard provides a host of highly customizable widgets that you can use to gain insights on specific scenarios. Vertical and horizontal Clustered and Stacked bars are added. Adding a dashboard widget on page 1333

Bot Insight changed features

The changed features in this release have not changed since the previous release.

Bot Insight fixed features

The fixed features in this release have not changed since the previous release.

Bot Insight deprecated features

The deprecated features in this release have not changed since the previous release.

Bot Insight known limitations

The known limitations in this release have not changed since the previous release.

Enterprise Version A2019 (Builds 1598 and 1610) Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Enterprise Version A2019 (Builds 1598 and 1610).

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

Version A2019 Builds 1598 and 1610

Build 1598 contains updates for the following:

- [Enterprise Community Edition](#)
- [Bot Insight](#)
- [IQ Bot A2019](#)

Build 1610 contains updates for the following:

- [On-Premises](#)
- [Bot Insight](#)
- [IQ Bot A2019](#)

New features in Version A2019 Builds 1598 and 1610

Feature	Description
Pre-migration utility for On-Premises	The Automation Anywhere pre-migration utility evaluates your 11.x bots for migration to A2019. Run the pre-migration utility to verify whether your existing 11.x bots can be migrated to A2019. Use the summary report generated by the utility to identify the bots that can and cannot be migrated and decide if you want to start the migration.  Note: This is an initial version of the pre-migration utility. We plan to include updates to the utility in upcoming releases to help migrate most of your bots.
On-Premises Windows installer	A2019 On-Premises Windows installer is certified for Azure.
Bot Creator and Bot Runner on Azure Cloud	Users can create and execute bots for devices on Azure Cloud.
Action localization	Labels, buttons, and tooltips are localized to the supported language set.
Updated action packages	• Additional REST Web Service error codes for better troubleshooting of API calls • PGP package for encrypting and decrypting files • Improvements to SAP actions

Feature	Description
Control Room to a SAML-based, SSO-authenticated Control Room	A2019 integrates with SAML identity providers (IDPs). Post installation, administrators can switch the Control Room to a SAML-based, SSO-authenticated Control Room.
Move email messages to different folder	The Move message command enables the user to move all the filter-matched emails to a different folder.

Supported packages

Package	Version
Node Manager	1.0.2110
Application	2.0.0-20191128-060339
Boolean	2.0.0-20191128-060340
Browser	2.0.0-20191128-060342
Clipboard	2.0.0-20191128-060350
Comment	2.0.0-20191128-060351
CSV/TXT	2.0.0-20191128-060352
Database	2.0.0-20191128-060354
DataTable	2.0.0-20191128-060707
DateTime	2.0.0-20191128-060358
Delay	2.1.0-20191128-060359
Dictionary	2.0.0-20191128-060400
DLL	2.0.0-20191128-060648
Email	2.0.0-20191205-100336
Error Handler	2.0.0-20191128-060404
Excel	2.0.0-20191128-060547
Excel_MS	2.0.0-20191128-060434
File	2.0.0-20191128-060407
Folder	2.0.0-20191128-060409
FTP/SFTP	2.0.0-20191128-060412
If/Else	2.0.0-20191128-060414
IR	2.0.0-20191121-100240
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20191128-060423
Keystrokes	2.0.0-20191128-060426
List	2.0.0-20191128-060427

Package	Version
LogToFile	2.0.0-20191128-060428
Loop	2.0.0-20191128-060429
MessageBox	2.0.0-20191128-060429
Mouse	2.0.0-20191128-060430
Number	2.0.0-20191128-060437
OCR	2.1.0-20191121-100301
PDF	2.1.0-20191128-060540
PGP	2.1.0-20191129-100500
Ping	2.0.0-20191128-060544
PlaySound	2.0.0-20191128-060545
Prompt	2.0.0-20191128-150505
Python	2.0.0-20191128-060553
Recorder	1.0.45-20190904-210340
Rest	2.0.0-20191128-060646
SAP	2.1.0-20191128.003143-259
Screen	2.0.0-20191121-100518
SNMP	2.0.0-20191128-060656
String	2.0.0-20191128-060704
System	2.0.0-20191128-150557
Terminal Emulator	2.0.0-20191128-060711
VBScript	2.0.0-20191121-110553
Wait	2.0.0-20191128-060716
Window	2.0.0-20191128-060718
XML	2.0.0-20191017-030831

Fixed features

The fixed features in this release have not changed since the previous release. For a list of these features, see [Enterprise Version A2019 \(Builds 1082 and 1089\) Release Notes](#) on page 181.

Security fixes

The security fixes in this release have not changed since the previous release. For a list of these fixes, see [Enterprise Version A2019 \(Builds 1082 and 1089\) Release Notes](#) on page 181.

Deprecated features

The deprecated features in this release have not changed since the previous release. For a list of these deprecations, see [Enterprise Version A2019 \(Builds 1082 and 1089\) Release Notes](#) on page 181.

Known limitations in Builds 1598 and 1610

- IQ Bot is not supported in Automation Anywhere Cloud and users cannot register any IQ Bot instance with the Cloud Control Room.
- If a bot is deployed on a device, no other bots can be deployed on that device until the first bot has completed the deployed task.
- When deploying a bot using Unattended Bot Runner on a virtual machine with Windows 10 desktop, users have to enable remote access to the device (Control Panel > System Properties > Allow Remote Access).
- Deploying a bot with Bot Runner on a locked device will leave that device in an unlocked state.
- A Bot Creator is not able to view devices as assigned by the Control Room administrator. With this release, changes to the basic role has removed the View and manage all devices permission so that unless this permission is expressly granted by the Control Room administrator, the Bot Creator will no longer be able to see other devices in the Control Room. Bot Creators can register their devices directly; however, they will not be able to see the other devices in the Control Room.
- Unable to deploy bots from a private workspace using the wizard. Bot Creators can deploy bots from the editor.
- If users have set up Active Directory for Control Room authentication, changing to SAML or Control Room Database is not supported.
- Device pool administrators can delete a device pool after automation is scheduled and assigned to the pool.
- Users without SMTP can still import bots and packages.
- When users delete a bot from the Public workspace, the same bot is deleted from the Private workspace as well.
- Elastic Search Disaster Recovery backup is not supported.
- Using the Run Task action with the child task using triggers is not supported.
- User cannot export a bot with dependencies if that user does not have access to any of the related dependencies.
- Users cannot check out bots if they are linked through circular dependencies.
- Minimizing the window for some Microsoft Active Accessibility apps, such as Notepad, Calculator, or Remote Desktop Applications, can cause the operation to fail.
- UI Automation, such as Snagit Editor Window for example, will not work in the background unless expressly minimized.
- UI Triggers are not generating events with Snagit Editor or Inflow app.
- Applications such as calculator use different technologies on Windows 10 vs. Windows 2012 or other servers. In these cases, when a bot is created in one server configuration, the bot cannot be carried to another server. User triggers in these cases will not trigger bot deployment and there are no errors in the trigger listener or node manager logs.
- UI Triggers that are configured with multiple triggers are taking as much as 25 seconds to complete.
- UI Triggers with a single capture and a filter do not work with files larger than 2 MB.
- Button events where a user is switched from one window to a new window of an application fail to deploy a bot when listening for UI Triggers.
- For Automation Anywhere Elastic Search Service users, the C:\ProgramData\AutomationAnywhere folder has to be removed before installing A2019.
- Users cannot enable SMTP with TLS for the On-Premises version of the Enterprise Control Room (On-Premises only).

- User credentials are not editable (On-Premises only).
- Even when a newly added device is registered correctly, the indication icon does not turn green.
- Activity - In Progress table is not cleaning event records until the user performs a hard refresh (F5) of the browser.
- Domains are not shown for the Device/Run as tab when creating a role. This option is also missing when running a bot.
- Node manager is not able to establish a handshake SSL connection to the Control Room running on SSL certificate (On-Premises only).
- Repository Management API is incomplete; there is only one URL in the Swagger file.
- Device pools display completed automations, not scheduled automations.
- If a user is not the device pool administrator, the devices are not correctly displayed when editing a device pool.
- For an Unattended Bot Runner, with a device assigned and auto-login credentials set, and Run as self selected, the Run now option is disabled.
- When a user is running a bot from the Run Wizard and the Bot agent requires an update, after the user has updated the agent from the pop-up box, the user cannot deploy the bot until the user navigates back to the previous page and returns to the workflow to run the wizard.
- Folder triggers do not deploy bots when a folder change event occurs.

IQ Bot A2019 Builds 1598 and 1610

IQ Bot On-Premises version is available for this release with no additional features or updates since the last release.

IQ Bot changed features

IQ Bot is compatible with A2019 Builds 1598 and 1610.

IQ Bot fixed features

The fixed features in this release have not changed since the previous release.

IQ Bot security fixes

The security fixes in this release have not changed since the previous release.

IQ Bot deprecated features

The deprecated features in this release have not changed since the previous release.

IQ Bot known limitations

There are no new known limitations in this release.

Bot Insight new features in Builds 1598 and 1610

Feature	Description
Operation dashboard	The Operation dashboard in Bot Insight displays the Audit dashboard. You can search for the dashboards using the Search text box. You can also customize the dashboards based on your requirements. Role-based access control and permissions are applied to the dashboards so that the dashboard shows data only a specific user is authorized to view. See Operations dashboard on page 1320.
Analytic visualization widgets	The following new widgets are added: - Stacked Bar Chart - Clustered Bar Chart See Adding a dashboard widget on page 1333.

Bot Insight changed features

The changed features in this release have not changed since the previous release.

Bot Insight fixed features

The fixed features in this release have not changed since the previous release.

Bot Insight deprecated features

The deprecated features in this release have not changed since the previous release.

Bot Insight known limitations

The deprecated features in this release have not changed since the previous release.

Enterprise Version A2019 (Builds 1082 and 1089) Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Enterprise Version A2019.

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

Version A2019 Builds 1082 and 1089

Build 1082 contains updates for the following:

- [Enterprise Community Edition](#)
- [Bot Insight](#)

Build 1089 contains updates for the following:

- [On-Premises](#)
- [IQ Bot A2019](#)
- [Bot Insight](#)

New features in Version A2019 Builds 1082 and 1089

Feature	Description
Universal recorder support for SAP	The universal recorder now supports the SAP graphical interface for fast and accurate control and ease of editing generated scripts.
Citrix support	Citrix agent enables remote application recording for object cloning on Citrix servers and leverages ICA to create user sessions.
Enhanced code editing	Select multiple lines of code in editor to copy, move, disable, enable, as well as disable/enable a line of an action in a bot script. Users can run bots from a particular line of code or action inside the bot.
Bot import and export	Users can export bots with dependencies into a common zip file, including all actions. Users can manually exclude packages from the export process. All imported action packages will be automatically installed into the target Cloud Control Room and the bots placed inside the user private workspace.
Background processing	Background processing for Citrix Virtual Apps and Windows native applications. Excel packages inherently support background processes.
REST package	Support for GET, POST (text, XML, and HTML), PUT, and DELETE methods. Authentication types supported include Basic, Logged-in AD user, and NTLM.
OCR Action	Users can capture window and capture image by path.
Active Directory integration for On-Premises	Allowing auto-discovery of sites and domains, Automation Anywhere Enterprise Version A2019 On-Premises integrates Active Directory to support multi-domain as well as multi-forest deployments.

Supported packages

Package	Version
Node Manager	1.0.1745
Application	2.0.0-20191016.213334-22
Boolean	2.0.0-20191017-030403
Browser	2.0.0-20191017-030404
Clipboard	2.0.0-20191016.213334-16
Comment	2.0.0-20191017-030408
CSV/TXT	2.0.0-20191017-030409
Database	2.0.0-20191017-030411
DataTable	2.0.0-20191029.062940-3
DateTime	2.0.0-20191017-030416
Delay	2.1.0-20191017-030417
Dictionary	2.0.0-20191017-140648
DLL	2.0.0-20191031-100332
Email	2.0.0-20191024-120209
Error Handler	2.0.0-20191031-100110
Excel	2.0.0-20191024-160417
Excel_MS	2.0.0-20191101-120011
File	2.0.0-20191017-140654
Folder	2.0.0-20191017-140657
FTP/SFTP	2.0.0-20191023-181858
If/Else	2.0.0-20191017-030432
IR	1.0.0-20190923-115359
IQ Bot	2.0.0-20191031-150538
JavaScript	2.0.0-20191031-100128
Keystrokes	2.0.0-20191018-100419
List	2.0.0-20191017-030447
LogToFile	2.0.0-20191017-030447
Loop	2.0.0-20191017-030449
MessageBox	2.0.0-20191017-030449
Mouse	2.0.0-20191017-030450
Number	2.0.0-20191029-100152
OCR	2.1.0-20191017-030626
PDF	2.1.0-20191017-030713

Package	Version
Ping	2.0.0-20191017-030715
PlaySound	2.0.0-20191024-160415
Prompt	2.0.0-20191024-160423
Python	2.0.0-20191031-100238
Recorder	1.0.45-20190904-210340
Rest	2.0.0-20191024-090501
SAP	2.1.0-20191031-100334
Screen	2.0.0-20191017-030809
SNMP	2.0.0-20191023-181621
String	2.0.0-20191025-221016
Terminal Emulator	2.0.0-20191023-181907
VBScript	2.0.0-20191031-100352
Wait	2.0.0-20191017-030828
Window	2.0.0-20191017-030829
XML	2.0.0-20191017-030831

Changed features

Changed features	
TaskBot	All rich features of MetaBot, such as DLL and code protection using execute permission, are now part of a standard TaskBot. This also includes inline scripting using Python, VBScripts, and more to help reduce the learning curve for new users and provides a uniform bot development experience.

Fixed features

The fixed features in this release have not changed since the previous release. For a list of these features, see [Enterprise A2019 \(Build 550\) Release Notes](#) on page 188.

Security fixes

The security fixes in this release have not changed since the previous release. For a list of these fixes, see [Enterprise A2019 \(Build 550\) Release Notes](#) on page 188.

Deprecated features

The deprecated features in this release have not changed since the previous release. For a list of these deprecations, see [Enterprise A2019 \(Build 550\) Release Notes](#) on page 188.

Known limitations in Builds 1082 and 1089

- IQ Bot is not supported in Automation Anywhere Cloud and users cannot register any IQ Bot instance with Cloud Control Room.
- To create database tables in Cloud Control Room where internet access is restricted and deploying Liquibase, users are required to unblock the Java process to connect to www.liquibase.org in order to download the schema and allow java.exe to have internet access.
- The Folder trigger has the following event options: create, modify, and delete. The File trigger only has the modify and delete event options.
- A bot cannot have duplicate Triggers that point to the same directory.
- Using the action Run Task with the child task using triggers is not supported.
- Activity - In Progress is not cleaning the event record until user does hard refresh (F5) of the browser.
- User cannot export a bot with dependencies if that user does not have access to any of the related dependencies.
- Users cannot checkout bots if they are linked via circular dependencies.
- Minimizing the window for some Microsoft Active Accessibility apps, such as Notepad, Calculator, or Remote Desktop Applications, can cause the operation to fail.
- UI Automation, such as Snagit Editor Window for example, will not work in the background unless expressly minimized.
- If the system Citrix plugin is not updated, the Recorder will not launch.
- If the user renames a previously saved recorder bot, a download error is generated and results in loss of images.
- For Elasticsearch users, remove the C:\ProgramData\AutomationAnywhere folder prior to installing A2019.
- Users cannot enable SMTP with TLS for the on-premises version of the Enterprise Control Room (On-Premises only).
- User credentials are not editable (On-Premises only).
- Installer fails to create credentials using Windows Authentication. Use SQL Authentication service credentials (On-Premises only).
- In an On-Premises environment, creating credentials with the Credential Vault is not supported in this release.
- When using the Recorder with Citrix in an On-Premises deployment, the Citrix Agent could generate an internal server error during the recording process.

IQ Bot A2019 Builds 1082 and 1089

IQ Bot Community Edition is available for this release. IQ Bot is not yet available on Automation Anywhere Enterprise Cloud.

See [IQ Bot Community Edition quick start guide](#) .

IQ Bot changed features

IQ Bot is compatible with A2019 Build 1089.

IQ Bot fixed features

The fixed features in this release have not changed since the previous release.

IQ Bot security fixes

The security fixes in this release have not changed since the previous release.

IQ Bot deprecated features

The deprecated features in this release have not changed since the previous release.

IQ Bot known limitations

For On-Premises, if IQ Bot and Enterprise Control Room are installed on the same machine, on restarting the machine, IQ Bot does not work, and displays an error message.



Note: We recommend restarting Automation Anywhere Control Room Reverse Proxy service to resolve the issue.

Bot Insight new features in Builds 1082 and 1089

Feature	Description
Smart data profiling for country, state, and zip codes	Bot Insight analyzes information provided in the variables to automatically identify information based on the country, state, and zip or postal code. You can use this information to create the World and US Map widgets. See Editing a data profile on page 1325.
Business data delete API	Use this API to delete logged data from either the production mode or the development mode for a particular Enterprise Control Room instance. See Delete task log data on page 1191.
Business data profile API	Use this API to extract the business data profile logged in Bot Insight. See Get bot variables data on page 1197.
Business data API	Use this API to extract the business data logged in Bot Insight. See Get task log data on page 1192.

Feature	Description
Resize dashboard widgets	You can resize and save the widgets in the Bot Insight dashboard based on your requirements. When you resize a dashboard widget, other widgets in the dashboard are automatically adjusted to fill in the available layout. See Editing a dashboard widget on page 1336.
US map widget	The US Map widget enables you to visualize and analyze information about Country, State, City, and Zip Code. See Adding a dashboard widget on page 1333.
World map widget	The World Map widget enables you to visualize and analyze information about Country, State, Zip Code, Latitude, and Longitude. See Adding a dashboard widget on page 1333.
Parent child dashboard	When you create a new bot, Bot Insight automatically creates a default dashboard. If you have a parent bot and a child bot, Bot Insight creates a separate dashboard for each of the bots. See Bot Insight dashboards on page 1318.
Notification of variable updates in the standard dashboard	Data profile updates are highlighted with a red dot in the standard dashboard. See Customizing a dashboard on page 1328.
Data logging	When you deploy and run a bot on the Bot Runner machine, Bot Insight aggregates all the information about that bot. The published dashboard for that bot displays the aggregated bot information. See Bot Insight dashboards on page 1318.
Bot Insight	The Analyze package provides the following functions to enable business analytics in the Bot Insight dashboard: - Analyze Open - Analyze Close

Bot Insight changed features

The changed features in this release have not changed since the previous release.

Bot Insight fixed features

The fixed features in this release have not changed since the previous release.

Bot Insight deprecated features

The deprecated features in this release have not changed since the previous release.

Bot Insight known limitations

The known limitations in this release have not changed since the previous release.

Enterprise A2019 (Build 550) Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Enterprise A2019 (Build 550).

New features in A2019 Build 550

Feature	Description
On-premises installer	The on-premises installation application for Enterprise A2019.
IQ Bot supports IE11	IQ Bot A2019 (Build 550) supports Internet Explorer version 11 (IE11).
Download all documents action	Use the Download all documents action to download the extracted results from an IQ Bot server that was created by running a TaskBot, using the Upload Document action.

Supported packages in Build 550

The supported packages in this release have not changed since the previous release. For a list of these packages, see [Enterprise A2019 \(Build 543\) Release Notes](#) on page 190.

Changed features

IQ Bot A2019 (Build 550) Changed Features	
Issue	Description
Language toggle UI redesigned	On the IQ Bot landing page, user can click the language toggle at the top right corner, to select a language from the drop-down list. The UI displays in the selected language. User can select a language from either the Enterprise Control Room or IQ Bot language toggle icon.  Note: After logging out of the system, the system performs a reset. This requires the user to select the language again at login.
Upload document action	The Upload document action lets you to upload documents for processing with IQ Bot, using a TaskBot.

Fixed features

IQ Bot A2019 (Build 550) fixed features:

- Japanese documents using Microsoft Azure Computer Vision OCR engine get classified correctly.
- In the Designer window, during document training, user is able to move from one page to the other successfully along with mapping of form and table fields.
- Download API can download successfully processed documents after moving the bot and learning instance to production.

Security fixes

No security features are introduced in this build.

Deprecated features

No deprecated features are introduced in this build.

Known limitations

IQ Bot A2019 (Build 550) known limitations:

- When using Internet Explorer (IE) 11, icons disappear after a page refresh. A hard refresh (Ctrl plus F5) helps fix the issue.
- When using Internet Explorer (IE) 11, if user imports a domain, the system shows an error message. However, the feature works as expected.

- User is unable to migrate IQBA files from other versions of IQ Bot.
- IQ Bot portal does not launch after a machine restart. User has to restart Automation Anywhere Control Room Reverse Proxy Service as well.

Enterprise A2019 (Build 543) Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Enterprise A2019 (Build 543).

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features in A2019 Build 543

Feature	Description
Next generation bot workbench	Create bots from any device, from anywhere through a web browser. The intuitive new design for applying multiple personas with varying bot building skills and a redesigned work area for simple assembly and deployment. These include: • A universal recorder to simplify capturing processes • List and Flow views for TaskBot creation • Powerful bot code management capabilities • Rich variable passing with no cross-language mapping required
Bot Runner	Access and run bots from the cloud. When bots are deployed to Bot Runners, any dependent actions are also deployed. When updates to Actions are available, the updates are also automatically pushed.
Package manager	The package manager centralizes control over bundled actions to enable users to deploy and upgrade only those targeted actions being used.
Advanced variable types	Access expanded variables and array types for enhanced action implementation, including DateTime, numbers, list, Boolean, dictionary, multi-dimension arrays for reading Microsoft Excel documents, and file data column for .CSV files.
Inline scripting	Native support for Python and VBScript inline scripting languages enables simple data passing between scripts and bots.
New UX	The new user experience provides assistance for users who are getting started and includes step-by-step guidance for common tasks.
Excel automation	Configure Microsoft Excel TaskBot automation without installing Microsoft Office on the Bot Runner machine.
Recording of automation	Record automation, even from a remote device.

Feature	Description
IQ Bot	Enterprise A2019 will fully support IQ Bot, the only AI-driven solution for users to automate processing of complex documents.
Bot Insight	The Analyze package provides the following functions to enable business analytics in the Bot Insight dashboard: - Analyze Open - Analyze Close

Table 1: Supported packages in Build 543

Package	Version
Node Manager	1.0.1221
Application	1.0.0-20190919.040305-1231
Boolean	1.0.0-20190919.040305-1435
Browser	1.0.0-20190919.040305-1287
Clipboard	1.1.0-20190919.040305-1492
Comment	1.0.0-20190919.040305-633
CSV/TXT	1.2.0-20190919.040305-1349
Database	1.1.0-20190919.040305-1287
DateTime	1.0.0-20190919.040305-1189
Delay	1.1.0-20190919.040305-1492
Dictionary	1.0.0-20190919.040305-1337
DLL	1.0.0-20190920.070246-677
Email	1.0.0-20190919.040305
Error Handler	1.0.0-20190919.040305-1333
Excel	1.1.0-20190921.042722-1353
Excel_MS	1.0.0-20190921.042722-1309
File	1.0.0-20190919.040305-1382
Folder	1.0.0-20190919.040305-1337
FTP/SFTP	1.0.0-20190919.040305-660
If/Else	1.0.0-20190919.040305-1375
IR	1.0.0-20190923.062209-1140
IQ Bot	2.0.0-20191031-150538
JavaScript	1.0.1-20190919.040305-989
Keystroke	1.1.0-20190919.040305-1492
List	1.0.0-20190919.040305-1466

Package	Version
Log to File	1.1.0-20190919.040305-1456
Loop	1.0.0-20190919.040305-1466
Message Box	1.1.0-20190919.040305-1492
Mouse	1.1.0-20190919.040305-1492
Number	1.0.0-20190919.040305-1148
PDF	1.1.0-20190919.040305-1492
Ping	1.0.0-20190919.040305-1319
PlaySound	1.0.0-20190919.054049-118
Prompt	1.1.0-20190919.040305-1180
Python	1.0.3-20190919.040305-1287
Recorder	1.0.45-20190904.153347-191
RunTask	1.1.0-20190701.181500-763
SAP	1.1.0-20190923.152217-493
Screen	1.0.0-20190919.040305-1105
SNMP	1.0.0-20190919.040305-359
Step	1.0.0-20190701.181442-695
String	1.1.0-20190919.040305-1469
Table	1.0.0-20190919.040305-719
VBScript	1.0.1-20190919.040305-1334
Wait	1.0.0-20190919.040305-1287
Window	1.0.0-20190919.040305-1333
XML	1.0.0-20190919.040305-717

Changed features

This build does not include any changed features.

Fixed features

No fixed features are introduced in this build.

Security fixes

No security fixes are introduced in this build.

Deprecated features

No deprecated features are introduced in this build.

Known limitations

Feature	Limitation description
Recorder	.NET Framework 4.6.1 is required for the Recorder package.
Bot agent	Users of build 543 are required to download and install the latest agent.
Bot Insight	Bot Insight has the following limitations: • Bot Insight dashboard does not support Drag and Drop to move and arrange the dashboard widgets within the dashboard. • The Date widget in the dashboard displays the Unix time stamp. • Bot Insight does not support the Aggregate By feature in the Table widget, if the table contains a Timestamp. • Once the bots run successfully, the default dashboard is generated after 5 to 10 seconds.

Community Edition A2019 Release Notes

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations in different Community Edition A2019 releases.

Follow the links to view the release note updates for the respective release.

Related concepts

[Enterprise A2019 Release Notes](#) on page 9

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

Community Edition A2019.19 Release Notes

Release date: 05 February 2021

Review the new features in the Community Edition A2019.19 release (Build 8098).

- [Community Edition](#) on page 194
- [AARI](#)
- [Discovery Bot](#) on page 197

Community Edition



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
New features in Data Table package (Service Cloud case ID: 00656843, 00707635) • Use the Change column type action in the Data Table package to perform operations on the column of a data table. Use this action to change the column data type to Boolean, Datetime, Number, or String. • Sort the data in the data table in Number, Datetime, Boolean, or String format. Data Table package on page 549
New action in App Integration package Use the Capture scrollable text action to extract text from the selected window or any control within the selected window and save it to a variable. If you click any control within the window, then text from that specific control is extracted. If you click outside the window, then all the text from that window is extracted. App Integration package on page 533
New encoding combo box option in Terminal Emulator for VT Series To send and receive Japanese text, you can now use the Encoding and CodePage combo boxes when you connect to the Terminal Emulator for the VT series terminal type. Using the Connect action on page 811
New actions in Active Directory package Use the following actions in the Active Directory to automate a task: • Move a computer Using the Move computer action on page 524 • Move an organizational unit Using the Move organizational unit action on page 528 • Add users to a group Using the Add users to group action on page 531 • Remove users from a group Using the Remove users from group action on page 531

New features
New system variable for new line character (Service Cloud case ID: 00669232, 00672775, 00673578) Use the \$String:Newline\$ system variable to add a new line character. This variable adds a new line character in various applications regardless of the operating system of the device.
Zero-size form for Enterprise A2019 (Service Cloud case ID: 00677611) The Run action uses the zero-size form with name AAZeroSizeForm that can be used by DLLs to identify zero-size forms created by Enterprise A2019.
Enhancement to define parent path in Active Directory When you establish a connection with an LDAP server, you can now select the LDAP path by connecting to the server. Using the Connect action on page 527
Obtain information about Run-As user after bot deployment Use the AATaskExecutor system variable to return the username, first name, last name, and email of the user that ran the bot. If the bot is deployed on an attended Bot Runner, this variable returns information about the logged-in user. If the bot is deployed by a trigger, this variable returns information about the user associated with that Bot Runner license. System settings and parameters on page 868
Enhancements to the Recorder - Universal Recorder now supports object capture in Mozilla Firefox. You must install the A2019 extension from Mozilla Firefox browser add-ons. - Capture table, grid view, and main window objects from SAP applications. Universal Recorder supported applications and browsers on page 841 Actions performed on objects captured with Universal Recorder on page 750

Automation Anywhere Robotic Interface (AARI)

New features
New filter task in the process editor In the process editor, the Filter Task enables users to filter variables such as human or bot task output with a specific filter criterion. Create an AARI process on page 912
New process task in the process editor Use the new Process Task option in the process editor to call a subprocess within the main process. This feature enables you to separate tasks into different processes instead of including all the tasks in a single process. Multiple teams can now work at the same time on different tasks within the main process and remain segregated, without any conflicts. Create an AARI process on page 912

New features
Hide a task or view a hidden task With a Bot Creator license, you can now perform the following: - Hide the display of human and bot tasks by selecting the Hide this task after completion option in the process editor. - View a hidden human or bot tasks by selecting the View hidden tasks option in the tasks view page. Create an AARI process on page 912
Edit title in process editor Users can now edit the title in the process editor.
Rich-text editor updates (web interface) In the web interface, you can use rich-text editor features such as bold text, italics, underline, alignment, formatting, color, and size in tasks.
Table element updates (web interface) In the web interface, the Table element now supports the use of date, number, drop-down, and text values in tasks.
Updates to elements in form builder The form builder now includes the following new elements: - Select Folder element: Add an upload folder option in the form. Using the Select Folder element on page 936 - Hyperlink element: Assign a URL in the form. Using the Hyperlink element on page 937
Enhancement to the Button element You can now use the Disallow button click when this form is first loaded option to disable the Button element in a form when it is displayed for the first time during bot runtime.
Enhancement to the Checkbox action trigger If a form with a Checkbox element is used within a trigger loop package, you can now use the Value selected and Value unselected trigger actions. Trigger loop package on page 819

Discovery Bot

New features
View the duration of each recorded step A recorded step is now displayed in minutes and seconds for the business user and analyst. Use this information to understand which steps are a bottleneck in the current process and will provide most benefit from automation. The step duration is displayed from the Recordings page (below the screenshot image), and from the View process and View opportunities page from the Preview pane window. Record a Discovery Bot business process on page 968
Recorder enhancements You can now perform actions such as double-click, drag-drop, click and hold, and text select when recording a business process. Record a Discovery Bot business process on page 968



Important: The supported packages information is moved to this topic: [Viewing package versions available in the Enterprise Control Room](#) on page 861.

Community Edition A2019.18 Release Notes

Release date: 05 January 2021

Review the new features and supported packages in the Community Edition A2019.18 release (Build 7560).

- [Community Edition A2019](#) on page 197
- [AARI](#)
- [Discovery Bot](#) on page 201
- [Bot Insight](#) on page 202
- [Supported packages](#)

Community Edition A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

Build 7560 (Community Edition) is compatible with Bot agent 16.19.8232.

New features
Configure timeout in Bot Migration package When migrating bots, you can now set a timeout value in the range of 3 through 90 minutes (default value is 90 minutes). If the migration of any specific bot is not completed within the set time, a timeout message is displayed and the migration process moves to the next bot.
Use regular expressions in variables (Service Cloud case ID: 00628227) Use regular expressions (regex) in value type variables to specify the entity on which you want to perform an operation. For example, actions in the File, Folder, String, and Window packages allow use of regular expression in variables. When 11.x or 10.x bots with commands that use regular expressions in variables are migrated, if their equivalent actions in Enterprise A2019 do not support regular expressions, the regular expression is converted to string in the migrated bots.
Recorder enhancements • Use the AISense Recorder Define option to record an interaction, such as click active text, with an object that is only visible when you hover the mouse over the object. • If you record a click and keystrokes in a text box with a Control Type of <code>PASSWORD_TEXT</code>, the Recorder does not capture the keystrokes entered into the field. Instead, the action selects the Set text option and offers users the option to select a credential from the Credential Vault, enter a credential variable, or enter an insecure string.
Efficiently map input and output variables between parent and child bots (Service Cloud case ID: 00537090, 00698697) For input variables, use the Quick map option to select the variables and set the values for the parent bot to pass. For output variables, use the Multiple variables tab to associate each dictionary key with a variable. This feature eliminates the need to use actions to extract the output dictionary values. Task Bot package on page 804 Using the Run action on page 805
Support for PowerBuilder application in App Integration package (Service Cloud case ID: 00680703) The App Integration package now supports PowerBuilder to capture and extract text from a window application. The Capture text of window action enables you to open a PowerBuilder screen to capture all the data and verify the captured text.
New action in Terminal Emulator package Use the Search Field action in the Terminal Emulator package to search for a field based on the text it contains. This action returns the name or index of the field based on the option selected. Terminal Emulator package on page 808
New action in PDF package Use the Get Property action in the PDF package to retrieve the properties of a PDF file and assigns the properties to a dictionary variable. Using the Get property action on page 738

New features

New actions in Browser package

Use the following actions in the Browser package:

- Close: Closes a Google Chrome browser window or tab.
- Get source code: Retrieves the source code of a web page and saves it to a string variable.
- Go back: Returns to a web page that you previously visited in the current tab.
- Open: Opens the browser to a specific web page in an existing tab, new tab, or window.
- Run JavaScript: Executes JavaScript in a web page.

[Browser package](#) on page 540

Specify application window dimensions

Use the Resize windows option to set the window height and width to specific dimensions or to the dimensions at which it was captured. This feature enhances the bot's ability to identify the target object.

The following packages support this feature:

- App Integration
- If Image recognition condition
- If Legacy Automation > Window Control condition
- Image Recognition
- Simulate keystrokes
- Legacy Automation Desktop > Manage windows controls action
- Loop While > Image recognition condition
- Loop While > Legacy Automation > Window Control condition
- Mouse
- OCR
- Screen

Support for function keys in Terminal Emulator package

Function keys (F1 through F24) are now supported to automate processes using ANSI and VT100 terminals in the Terminal Emulator package.

Use regex case insensitive flag for Window title

Enable the regex Case insensitive flag to identify a Window title field as not case-sensitive. This feature enables you to successfully run the bots even if the letter case does not match the captured window title.

The following packages and actions support this feature:

- Wait
- Image Recognition
- Simulate keystrokes
- Mouse > Click action
- Legacy Automation Desktop > Manage windows controls
- OCR > Capture window, Capture area
- Screen > Capture window, Capture area
- Recorder > Capture
- Window: Activate, Close, Maximize, Minimize, Resize

Automation Anywhere Robotic Interface (AARI)

New features
New AARI web package Use the AARI web package to perform actions such as assign, query, and cancel tasks; create and query requests; and retrieve a list of team members. AARI web package on page 519
Filter by time You can now filter your requests and tasks by time: • Requests tab: Use the Created and Updated options in the Filter window to select any dates. • Tasks tab: Use the Task created and Task updated options in the Filter window to select any dates. Filter and search for a request on page 924 Filter and search for a task on page 926
View updated dates • Use the new Updated column in the Requests tab to view the dates and time of a request that was last updated. • Use the new Task Updated column in the Tasks tab to view the date and time of a task that was last updated.
Variable options In the Insert a variable window, the Variable field now shows child elements of available references, which include Dictionary, List, Record, and Table variable types.
Delete a request AARI administrators, managers, and users can now delete requests created by the AARI process. The AARI administrator can delete any requests. AARI managers can delete requests of the team for which they are the owner. AARI users can delete only the requests they have created. Delete a request on page 922
Automatically assign managers and users Users can now select the Auto assign this task option in the Human Task to assign managers or users to the task. Users can also select the Auto assign the target task to option in the Go to element to assign managers to the task. Create an AARI process on page 912

Discovery Bot

New features
Access Discovery Bot capabilities in Community Edition Discovery Bot is now available in the Community Edition and the free trial version. Log in to the Enterprise Control Room and click the Discovery Bot tab on the left panel to get started. The available limits to create processes, recordings, views, and opportunities are displayed on the respective page. Create any number of bots and download a PDD for your personal use as required. A single Community Edition user is a multi-role user with Admin plus Business user plus Analyst permissions. Get started with Discovery Bot on page 951
Use Model option for system-generated views You can now use the Model option to compare and find the best aggregated view for your recordings. Use this option to save as many views with different combinations as required. You can also save the view as a manual view to further customize your view and compare side-by-side. Select either an Easy or Strict model so that you can view recordings where the steps are the same versus recordings with different results with more branches in the process path. Create a process view with branches and opportunities on page 976
Use Filter option for system-generated views You can now use the Filter option to use a set of values to compare different sections of a process across various recordings by selecting a specific path and step filter. Used along with the Model option, the path and step filter options for a system-generated or manual view can help you to determine and decide on a good candidate for automation. Create a process view with branches and opportunities on page 976
Use toggle frequency counter option for system-generated views You can now use the toggle frequency counter to display the number of recordings that a particular path takes in the flow in a system-generated view. Use this option to help you understand the frequency of the path compared to other recordings or views. Create a process view with branches and opportunities on page 976
Remove recording screenshot for data privacy Use the Screen option (icon) to display or hide the recording screenshot before submitting the recording for the analyst to review. Use this option when you do not want to share personal image details with the analyst. Record a Discovery Bot business process on page 968
Download PDD from the Opportunities table You can now download a process definition document (PDD) for an opportunity directly from the Opportunities table listed on the Opportunities page. The PDD is automatically generated when the opportunity is created. After the PDD is generated, the field changes from generating PDD to Download PDD. You can then download and save the document. Review opportunities and convert to bot on page 983

Bot Insight

New features
Access Bot Insight data from Tableau Use the Tableau connector in Bot Insight to access business and operational information. The Tableau connector connects to the Bot Insight APIs to create various business and operational metrics that you can analyze and visualize within Tableau. Configure Tableau web data connector in Bot Insight on page 1340

Supported packages

Package	Version
Application	2.1.0-20201112-22332
App Integration	2.3.0-20201210-171315
Active Directory	2.1.0-20201112-223323
Boolean	2.1.0-20201126-165109
Browser	2.3.0-20201211-222811
Clipboard	2.1.0-20201126-165124
Comment	2.3.0-20201126-165125
CSV/TXT	2.3.0-20201126-165126
Database	2.2.0-20201112-223343
Data Table	2.5.0-20201201-130615
Datetime	2.2.0-20201126-165136
Delay	2.2.0-20201126-165137
Dictionary	3.2.0-20201126-165138
Run DLL	3.3.0-20201126-165850
Email	3.2.0-20201120-062604
Error handler	2.3.0-20201126-165148
Excel basic	2.4.0-20201126-165604
Excel advanced	5.3.0-20201208-090251
File	3.2.0-20201126-165151
Folder	3.1.0-20201126-165154
FTP / SFTP	2.2.0-20201115-072759
Image Recognition	2.2.0-20201117-081754
JavaScript	2.4.0-20201126-165412
Simulate keystrokes	2.5.0-20201112-223902

Package	Version
Legacy Automation	3.2.0-20201124-064544
	1.5.0-20201125-004358
List	2.2.0-20201126-165427
Log To File	2.2.0-20201126-165428
Loop	2.1.0-20201126-165429
Message Box	2.1.0-20201126-165430
Mouse	2.2.0-20201112-223917
Number	2.1.0-20201126-165444
OCR	2.3.0-20201126-081210
Office 365 Excel	2.2.0-20201104-062559
Office 365 Calendar	2.1.0-20201111-162101
Office 365 OneDrive	2.2.0-20201126-165550
PDF	2.6.0-20201126-165555
PGP	2.2.0-20201126-165557
Ping	2.1.0-20201126-165559
Play Sound	2.1.0-20201127-115706
Prompt	2.2.0-20201109-192507
Python Script	2.4.0-20201208-064944
Recorder	2.1.0-20201215-211402
REST Web Service	3.2.0-20201112-224735
SAP	2.2.0-20201126-165852
Screen	2.2.0-20201126-165855
SNMP	2.1.0-20201126-165859
SOAP Web Service	3.2.0-20201123-093411
String	3.1.0-20201126-165909
System	3.0.0-20200921-090225
Terminal Emulator	3.6.0-20201213-084139
VBScript	2.4.0-20201208-065526
Wait	3.1.0-20201126-165922
Window	2.3.0-20201123-093430
Workload	2.1.0-20200825-071644
XML	2.1.0-20201126-165927

Community Edition A2019.17 Release Notes

Release date: 13 November 2020

Review the new features and supported packages in the Community Edition A2019.17 (Build 7103) release. IQ Bot is on Build 7082.

- [Community Edition A2019](#) on page 204
- [AARI](#)
- [IQ Bot](#) on page 208
- [Bot Insight](#) on page 208
- [Supported packages](#)

Community Edition A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

New features

Connect to EWS server with OAuth authentication

A new authentication is available for the Exchange Web Services (EWS) protocol with OAuth. You can use the OAuth authentication and enable your EWS-managed API applications to access Exchange online in Office 365.

[Using the Connect action](#) on page 588

VT220 terminal type supported in Terminal Emulator

To establish a connection and communicate with another machine, you can now use the VT220 terminal for sending and receiving text.

[Using the Connect action](#) on page 811

New features
Enhancements to the Recorder - Record a task using the Universal Recorder or AISense Recorder from a single point of entry. Both recorders are now managed through a single package, which enables faster and more efficient updates. - You can now record tasks in a Microsoft Edge browser that runs on Chromium (versions 79 and later). - Use the AISense Recorder Define option to capture an object that is only visible when you hover the mouse over the object. - Use the Resize window option in the Recorder > Capture action to set the window width and height. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, thus increasing the likelihood that the bot identifies the target object. Get started with recorders on page 836 Universal Recorder supported applications and browsers on page 841 Using the Capture action on page 758
Use shared session in Terminal Emulator Use the new Shared session option to pass the exact state of an application to a concurrently occurring TaskBot or MetaBot logic. For example, instead of connecting to the same application multiple times for different tasks, you can use the option to connect to the application using a single task, thus optimizing your automation logic in the long run. Share session between TaskBot logic on page 818
Share an Excel session between bots Use the Set session action from the Excel basic or Excel advanced package to assign an Excel session to a variable, and then pass that variable from a parent to a child bot. This enables the child bot to access the worksheet opened in the parent bot. Excel basic package on page 601 Excel advanced workbook operations Example of sharing an Excel session between bots on page 806
New option for Run Task In the Task Bot package, you can now use the Run action with an option to repeat the selected task until you choose to stop it.
New search for roles in User Management API Use the new <code>search_for_roles</code> API in the User Management APIs in Swagger to obtain a list of all the roles or details for a specific role. Search for roles API on page 1258
Capture response status of REST API In the REST Web Service package, you can capture the response status of the REST API in the dictionary variable. The dictionary variable now shows the response key with its value.
New option for REST Web Service (Service Cloud case ID: 00489741, 00646436) Use the Capture failure response action in the REST Web Service package to capture response details in the response body.

New features

Use regular expressions in packages

You can use regular expressions (regex) in certain actions to support pattern-based search in a file, folder, or Windows title. Regular expressions are supported in the actions of the File and File and Folder packages such as Copy, Delete, Rename, Print Multiple files, and Zip.

You can also use regular expressions in some packages that support the wildcard character in their window titles.

The following packages and actions support regular expressions:

- Wait
- Image Recognition
- Simulate keystrokes
- Mouse > Click action
- Legacy Automation > Manage windows control
- OCR
- Screen
- Recorder > Capture
- Run DLL > Run function (Legacy), Run function
- Window: Activate, Close, Maximize, Minimize, Resize

[Using Copy action for file](#) on page 628 | [Using the Capture action](#) on page 758

Support for overloaded functions in DLL package

The DLL > Run function action can now handle .dll files that contain multiple functions of the same name. The action calls the function based on the number of parameters passed.

[Using the Run function action](#) on page 582

New actions for SAP captured objects

Use new actions that are available for Tree, Tab, and Label controls to perform operations for the various objects captured from an SAP application.

[Actions supported in various SAP versions](#) on page 771

Store multiple lines of text in a string variable

You can use a string variable containing multiple lines of text in the following actions:

- String > Assign
- String > Extract text
- String > Compare
- String > Lowercase
- String > Replace
- String > Reverse
- Log to file
- Message box
- The string condition in the If, Wait, and While actions

New features

Arabic, Japanese, and Russian characters supported in variable names

You can now create variables with names containing Arabic or Russian characters, or Japanese double-byte numbers.

[Unicode range supported in variables](#) on page 876

Automation Anywhere Robotic Interface (AARI)

New features

View previous selected tasks

AARI users can now reference selected actions of their tasks. When they view a submitted task in request view, a check mark indicator is now displayed next to the buttons that are selected.

Run a process in private workspace

You can now run a process in your private workspace by using the Run option in the process editor. The bots in the process are then executed on the default device of the Bot Creator.

[Automation Anywhere Robotic Interface processes](#) on page 910.

Use variables types

You can now use new variables in the process editor such as createdOn and updatedOn (DateTime), id (Number), and title (String). These variables are part of a data flow (workflow engine) that moves data between each step of a process and requires variable input for the process to run properly.

[AARI variable types](#) on page 915

Use the Data Privacy tag field

The Data Privacy tag enables users to generate hidden custom output in their process tasks (Start panel, Human Task, and Bot Task). Users can enter the variables for this field during runtime with values. In the web portal, the AARI admin can use this tag to check for requests or tasks by using personal user data. The admin can also filter using this field.

[Create an AARI process](#) on page 912 | [Filter and search for a request](#) on page 924 | [Filter and search for a task](#) on page 926

IQ Bot

New features	
Support for Arabic language When creating a learning instance, you can now choose the Arabic language from the Primary language of documents drop-down menu, with the following limitations: • Advance table extraction is not available. • Search field on the Validator is not supported. • Arabic numerals are not supported. For example, if the document has date or time in Arabic language, it is extracted as text and validations can fail.  Note: You can still use string-based validation checks (such as regular expressions) for Arabic numerals. • Arabic is only supported on ABBYY FineReader Engine 12.4. Creating a learning instance	
Default validations for a group When editing a learning instance, you can now use the Select the default validations group drop-down menu to select an available group. This allows all the new group documents in production to be extracted based on the custom logic and validations defined in this selected group, before it goes to the Validator. Edit a learning instance	

Fixed features	
Service Cloud case ID	Description
-	You can now create and edit a bot even if a document associated with a deleted bot appears in production. Previously, if a bot was deleted and a document associated with it appeared in production, you could not create a new bot.

Bot Insight

New features
New AARI dashboard in Bot Insight Use the AARI dashboard to view various widgets that provide information about requests created from published processes in AARI. The dashboard also provides statistics on the status of created requests. AARI dashboard on page 1324

Supported packages

Package	Version
Application	2.1.0-20200921-085720
App Integration	1.1.0-20201014-042506
Analyze	2.2.4-20200903-113949
Active Directory	2.1.0-20200921-085716
Boolean	2.1.0-20201014-042509
Bot Migration	2.5.0-20200902-045043
Browser	2.1.0-20201002-123733
Clipboard	2.1.0-20201014-042520
Comment	2.2.0-20201014-042520
CSV/TXT	2.3.0-20201014-082525
Database	2.2.0-20201013-052941
Data Table	2.3.0-20201030-143334
Datetime	2.2.0-20201014-042531
Delay	2.2.0-20201014-042532
Dictionary	3.2.0-20201014-042532
Run DLL	3.2.0-20201105-205159
Email	3.1.0-20201104-062204
Error handler	2.2.0-20201014-042541
Excel basic	2.3.0-20201027-160012
Excel advanced	5.1.0-20201027-155758
File	3.1.0-20201016-065515
File & folders	1.1.0-20201023-202725
Folder	3.0.0-20201016-065517
FTP / SFTP	2.1.0-20200921-085757
IF/ELSE	2.1.0-20200921-085758
Image Recognition	2.1.0-20201014-042552
Interactive forms	2.17.3-20201102-103733
IQ Bot	2.1.0-20201013-095304
JavaScript	2.3.0-20201104-062431
Simulate keystrokes	2.4.0-20201021-163833
Legacy Automation	3.2.0-20201104-062439
	1.3.0-20201105-151906

Package	Version
List	2.2.0-20201014-042806
Log To File	2.2.0-20201014-042806
Loop	2.1.0-20201014-042808
Message Box	2.1.0-20201014-042808
Migration	2.7.0-20201106-072418
Mouse	2.1.0-20201014-042814
Number	2.1.0-20201014-042823
OCR	2.2.0-20201104-062503
Office 365 Excel	2.2.0-20201104-062559
Office 365 Calendar	2.1.0-20200921-085726
Office 365 OneDrive	2.1.0-20201014-042924
PDF	2.5.0-20201014-042929
PGP	2.2.0-20201014-042931
Ping	2.1.0-20201014-042932
Printer	2.1.0-20200921-090131
Play Sound	2.1.0-20200921-090123
Prompt	2.1.0-20200918-081201
Python Script	2.3.0-20201105-204912
Recorder	2.0.9-20201105-164103
REST Web Service	3.1.0-20200928-231420
SAP	2.2.0-20200921-090209
Screen	2.1.0-20201014-043037
SNMP	2.1.0-20201014-043041
Service	3.0.0-20200921-090214
SOAP Web Service	3.1.0-20200921-090219
String	3.1.0-20201014-043052
System	3.0.0-20200921-090225
Task	2.0.1-20201023-202703
Terminal Emulator	3.4.0-20201028-021451
Trigger Email	1.1.0-20201105-152220
VBScript	2.3.0-20201105-205228
Wait	3.1.0-20201014-043117
Window	2.2.0-20201022-121649
Workload	2.3.0-20201105-205233

Package	Version
XML	2.1.0-20201014-043121

Enterprise A2019.19 cloud sandbox release notes

Release date: 11 February 2021



Important: The sandbox environment is for Enterprise A2019 Cloud customers only.

The sandbox environment enables you to test your production bots to ensure they work seamlessly in the production environment. Use the sandbox environment to plan and test new features for upcoming Enterprise A2019 releases.



Note: For information about supported packages, see [Viewing package versions available in the Enterprise Control Room](#) on page 861.

Enterprise A2019



Bot agent update: This release includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities when upgrading from a previous release to this release.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

To verify which Bot agent version is compatible with this Enterprise A2019 release, see [Compatibility with Enterprise A2019 builds](#) on page 403.

New features
Auto-login settings Use the auto-login configuration in the Enterprise Control Room to reduce bot startup time by reusing an existing user session. Configure auto-login in the Administrator settings for all devices or customize it from the Devices page for each device. • Configure the auto-login settings for a user session to create a new session or reuse an existing session • Keep user sessions unlocked • Log off from a user session after the bot completes execution Configure auto-login settings on page 1134 Devices on page 1067
New CPU utilization and device memory settings Configure the CPU utilization and device memory threshold value in the Enterprise Control Room settings to determine whether to deploy bots on devices or not. Configure threshold settings for user devices on page 1134

New features Install Bot agent on devices without administrator privileges You can now choose to install the Bot agent on user devices with either local user privileges (without administrator privileges) at the local user level or administrator privileges at the system level. Install Bot agent and register device on page 400 Create device pools on page 1074 User management on page 1104 When you install the Bot agent at the user level, the device will not be available as a default device for another user or for device pool selection during bot deployment. For more information, see Bot agent known limitations.
New diagnostic utility for Bot agent Use the Bot agent diagnostic utility to perform diagnostic checks on Bot Runner devices and to resolve Bot agent connectivity issues. Perform Bot agent diagnostic checks on page 416
New features in Data Table package (Service Cloud case ID: 00656843, 00707635) • Use the Change column type action in the Data Table package to perform operations on the column of a data table. Use this action to change the column data type to Boolean, Datetime, Number, or String. • Sort the data in the data table in Number, Datetime, Boolean, or String format. Data Table package on page 549
New action in App Integration package Use the Capture scrollable text action to extract text from the selected window or any control within the selected window and save it to a variable. If you click any control within the window, then text from that specific control is extracted. If you click outside the window, then all the text from that window is extracted. App Integration package on page 533
New encoding combo box option in Terminal Emulator for VT Series To send and receive Japanese text, you can now use the Encoding and CodePage combo boxes when you connect to the Terminal Emulator for the VT series terminal type. Using the Connect action on page 811
New actions in Active Directory package Use the following actions in the Active Directory to automate a task: • Move a computer Using the Move computer action on page 524 • Move an organizational unit Using the Move organizational unit action on page 528 • Add users to a group Using the Add users to group action on page 531 • Remove users from a group Using the Remove users from group action on page 531

New features
New system variable for new line character (Service Cloud case ID: 00669232, 00672775, 00673578) Use the \$String:Newline\$ system variable to add a new line character. This variable adds a new line character in various applications regardless of the operating system of the device.
Zero-size form for Enterprise A2019 (Service Cloud case ID: 00677611) The Run action uses the zero-size form with name AAZeroSizeForm that can be used by DLLs to identify zero-size forms created by Enterprise A2019.
Enhancement to define parent path in Active Directory When you establish a connection with an LDAP server, you can now select the LDAP path by connecting to the server. Using the Connect action on page 527
Obtain information about Run-As user after bot deployment Use the AATaskExecutor system variable to return the username, first name, last name, and email of the user that ran the bot. If the bot is deployed on an attended Bot Runner, this variable returns information about the logged-in user. If the bot is deployed by a trigger, this variable returns information about the user associated with that Bot Runner license. System settings and parameters on page 868
Enhancements to the Recorder - Universal Recorder now supports object capture in Mozilla Firefox. You must install the A2019 extension from Mozilla Firefox browser add-ons. - Capture table, grid view, and main window objects from SAP applications. Universal Recorder supported applications and browsers on page 841 Actions performed on objects captured with Universal Recorder on page 750
Multi-user device supported on Citrix Windows 10 Enterprise (Service Cloud case ID: 00526001) Multi-user device sessions are now supported on Windows 10 Enterprise on Citrix, enabling multiple users to access the same device at the same time.
Auto Login support on Citrix VDI (Service Cloud case ID: 00680200) Auto Login is now supported on Citrix VDI, which enables bot deployment in unattended mode. Configure auto-login settings on page 1134.
Restore bots from Git repository If your database is deleted or corrupted, the admin user can restore all your bots and the associated dependent files from the Git repository to your new empty database. Restore bots from Git repository on page 1141
Changed features
Enhanced security for multi-user Bot agent devices (Service Cloud case ID: 00695858) The Bot agent configured on multi-user devices for RDP-based deployments now uses the updated version of <code>wfreerdp.exe</code> for enhanced security.

Changed features	
Deployment API enhancement (Service Cloud case ID: 00655548)	
When you invoke a regular deployment API, if a RunAsUser is being used to deploy a bot, the deployment API will not deploy other bots until the RunAsUser is free to run the other bots.	
Status change initiates workload automation deployment	
When you change the status of a Work Item from Failed to New in the Enterprise Control Room (Queues), the deployment of a workload automation in queue is initiated.	
Install Google Chrome extension offline with Bot agent (Service Cloud case ID: 00623511, 00689623, 00715413)	
You can now install the Google Chrome extension offline from the Bot agent setup and MSI files.	
ANSI as default encoding in Data Table package	
For text write operations, Data Table package > Write to file action supports ANSI as default encoding type.	
Bots created in the previous version of Enterprise A2019 with UTF-8 is not impacted by this change.	
Enhancement to PDF package	
In the PDF package, when you enter an incorrect page range in the Page range field and execute the bot, an error message is now displayed, requesting you to provide the correct page range. The message is displayed for the following actions:	
• Merge document • Split document • Extract text • Extract image	
Bots wait for Google Chrome web page to load	
When automating a task in the Google Chrome browser, bots now wait up to 30 seconds for the web page to load, and then run the subsequent Recorder > Capture action. When the page loads, bots search for the object for the duration specified in the Wait for control field. Waiting for the web page to fully render increases the bot's ability to identify the target object in the web page.	
Enhancement to desktop operations	
When you create a bot and select an option for desktop operations, the data selected from the drop- down list now persists even when you navigate to other fields.	

Fixed features	
Service Cloud case ID	Description
--	The Bot Scanner now displays the correct message for the MetaBot logic that contains credential variables that cannot be migrated to Enterprise A2019.

Fixed features	
Service Cloud case ID	Description
00687223	A 11.x bot that passes a blank value as an input to the string, list, one-dimensional array, and two-dimensional array of string type variable used in a DLL no longer encounters an error when you run that bot in Enterprise A2019 after migration.
00677231	A bot is no longer unresponsive if it contains an action to close the Google Chrome browser followed by an action to open the Google Chrome browser.
00687207	When a 11.x bot contains objects captured using the Object Cloning command and that object has a property that contains an expression within the \$ character, the 11.x bot no longer encounters an error after migration to Enterprise A2019.
00689286	The Bot Scanner no longer encounters an error when you scan a 11.x bot that contains the If command with the Windows control condition selected and is automating a task on a Microsoft Excel file.
00706438	An error is no longer encountered when you are installing Enterprise A2019 and: - You are migrating from 11.x to Enterprise A2019 - Active Directory is configured on the 11.x Enterprise Control Room - The restored 11.x database contains the AAE_Meta Bot Designer role
00626664	You can now migrate bots that automate tasks in BMC applications. The migrated bots use the Legacy automation > Manage web controls action to automate interactions with objects.
--	You can now select the regular expression Case insensitive option in actions that contain a window title field and successfully perform a recapture in the application window.
00688134	In the Database package, Korean characters are now displayed properly when you use the Insert/Update/Delete action in an Excel file. Previously, the Korean characters were not displayed properly when the action was used.

Fixed features	
Service Cloud case ID	Description
00675749	In the Email package, you can now forward an email using groupId or Alias. Previously, the mails were not sent by the SMTP server if the email address contained groupId or Alias in the To address field.
--	You can now use a double backslash (\\) in the Send text action of the Terminal Emulator and execute bots. Previously, when a double backslash (\\) was used in this action and the bot was executed, the terminal displayed a single slash (\).
00688692	When you connect to the EWS server to read mails using Loop, the retrieved email now displays the content correctly per the selected mode (HTML or plain text formats). Previously, when connecting to the EWS server to read an email in HTML format, the email body displayed a blank output.
00659456	In the Loop package, when you select For each file in folder as the Iterator option, the Note below the Assign file name and extension to this variable field now displays the key name in English. Previously, the key name in the Note was translated to the languages you selected.
--	A bot no longer runs intermittently when the focus changes from one window to another window and does not display the Type_015 Google Chrome plug-in error.
00683528	In the Database package, single entries are now inserted in the database when you execute a store procedure to add rows in the table and the option Export data to CSV is selected. Previously, duplicate entries were added in the database.
00693664	Fixed an issue where Japanese characters did not display correctly when input into a field that contained a variable.
00677167	The locker Participants tab now shows only the assigned participants for that specific locker. Previously, the tab displayed the participants of the previously viewed locker, requiring the user to refresh the browser to see the correct participants.
--	The Enterprise Control Room services can now be run using the non-administrator service account users. The Bad Gateway error message is no longer displayed.

Fixed features	
Service Cloud case ID	Description
00691232	Fixed an issue that did not allow users to update the value of a file type input variable after saving the bot.
--	The Save option is now correctly enabled when users make any changes to the metadata, unique entity, or SAML assertion mode.
--	The username is no longer saved in the login window after the user logs out unless the user has selected the Remember my username option.
00682021	When you check in a bot that has cloned bots as dependencies, the dependent files are no longer lost from the private workspace. Also, after the check-in, if you create a new bot using the same dependencies as in the earlier bot, the new bot executes successfully.
--	Work Items are now processed for workload automation after you add more Work Items to an existing queue.
--	Work Items are now reprocessed for workload automation after you change the status from failed to new.
00711410	You can now migrate workload automations in an Enterprise Control Room configured to use a manual mode for Credential Vault.
00667047, 00673289	Auto-login for a user session no longer fails for bots deployed on virtual machines when the VDI session is disconnected or is in a locked state, and the following token error message is no longer displayed: An attempt was made to reference a token that does not exist.
00560593, 00585092	Universal Recorder is now aligned with the Bot agent, so the recorder can capture objects on devices with any proxy server configuration.
00675695	When you use the Excel advanced package, the bot now opens an Excel file without any issues. Previously, the bots failed to open an Excel file in some scenarios due to internal hardware components.
00678567	CSV formulaic entries are no longer permitted in data fields of web applications, such as device names. These fields are limited to accept alphabetic characters, numbers, hyphen, and underscore entries only.

Fixed features	
Service Cloud case ID	Description
00691551	Turkish characters are now supported in user names.

Known limitations
Bot agent installation Starting from this release, when you install the Bot agent at the local user level, keep the following in mind: - You cannot install the Bot agent at the user level if you log in to the device as the root administrator. - Auto-login is not supported for local users and unattended Bot Runners. - The auto-update feature for the Bot agent will be applicable from the subsequent release because the option to install the Bot agent at the local user level is introduced in this release. - You cannot configure multi-user devices. - Enterprise A2019 recorders for third-party applications: - No separate setup is required for JRE 6 and 7. - Citrix XenApp is not supported because administrator privileges are required to set up Citrix. - You must upgrade to the Enterprise A2019.19 Recorder package to use Discovery Bot. - You must have write permission to AISense Recorder logs.
Bots encounter a Java heap space error when they use the Excel basic package to open an Excel file that is 20 MB or larger. Workaround: Increase the Java virtual machine heap space to 8 GB: - Navigate to <code>C:\Program Files\Automation Anywhere\Bot Agent\config</code>. - If it does not already exist, create a new text file named <code>nodemanager.properties</code>. - Open the file and copy the following text and paste it in the file: <code>bot.launcher.jvm.options=-Xmx8092m</code> - Open Windows Services and restart the Bot agent.
Bots wait a maximum of 30 seconds for an object to appear in the Google Chrome browser, regardless of the value in the Wait for control field in the Recorder > Capture action.

Automation Anywhere Robotic Interface (AARI)

New features
New filter task in the process editor In the process editor, the Filter Task enables users to filter variables such as human or bot task output with a specific filter criterion. Create an AARI process on page 912

New features
New process task in the process editor Use the new Process Task option in the process editor to call a subprocess within the main process. This feature enables you to separate tasks into different processes instead of including all the tasks in a single process. Multiple teams can now work at the same time on different tasks within the main process and remain segregated, without any conflicts. Create an AARI process on page 912
Hide a task or view a hidden task With a Bot Creator license, you can now perform the following: • Hide the display of human and bot tasks by selecting the Hide this task after completion option in the process editor. • View a hidden human or bot tasks by selecting the View hidden tasks option in the tasks view page. Create an AARI process on page 912
Edit title in process editor Users can now edit the title in the process editor.
Rich-text editor updates (web interface) In the web interface, you can use rich-text editor features such as bold text, italics, underline, alignment, formatting, color, and size in tasks.
Table element updates (web interface) In the web interface, the Table element now supports the use of date, number, drop-down, and text values in tasks.
Updates to elements in form builder The form builder now includes the following new elements: • Select Folder element: Add an upload folder option in the form. Using the Select Folder element on page 936 • Hyperlink element: Assign a URL in the form. Using the Hyperlink element on page 937
Enhancement to the Button element You can now use the Disallow button click when this form is first loaded option to disable the Button element in a form when it is displayed for the first time during bot runtime.
Enhancement to the Checkbox action trigger If a form with a Checkbox element is used within a trigger loop package, you can now use the Value selected and Value unselected trigger actions. Trigger loop package on page 819

Changed features
Create and view requests (AARI manager) An AARI manager can create and view requests from processes that are assigned to the team they belong to or own. They can also create and view requests from processes that are assigned to themselves but not to the team.
Cannot assign the same device to Bot Creator and unattended Bot Runner for triggers After you update to this Enterprise A2019 release from an earlier version, a default device that is assigned to a Bot Creator or an attended Bot Runner cannot be assigned to an unattended Bot Runner for deploying triggers. Recommended: Use separate devices or device credentials (auto-login) for a Bot Creator and an attended Bot Runner as deployments can overlap or override across licenses.

Fixed features	
Service Cloud case ID	Description
00707684, 00707688, 00707192, 00706781, 00707900, 00709109	All event triggers are now retained when you update to this Enterprise A2019 release from an earlier version.
--	In the process editor, undo and redo functions are now available for both canvas and properties panel interactions by default. Previously, the undo and redo functions were only available for canvas interactions.
--	Previously during bot runtime, if you deleted all the existing rows from a table before adding a new row, the columns and rows of the table were misaligned. You can now drag and resize any column to reset the table alignment.
--	All the trigger events within a form are now retained and no longer fail when the form is closed and reopened during bot runtime.
--	In the process editor, if you replace the Go to option with an End process, the End process icon now displays the correct status (Completed, Failed, Canceled). Previously, the status was not displayed correctly and had to be changed manually by using the End process option.
--	When you delete a request from the Request tab and it is sent to the recycle bin, the related task from the Task tab is now removed.
--	When you filter your tasks in the Task tab, the results shown in the tab now retain the information when you navigate between different tabs.

Deprecated features

Support removed for device pool configuration

An AARI administrator can no longer use the device pool configuration to deploy bots in a process. After upgrading to Enterprise A2019.19 from an earlier version, verify that the scheduler user configuration is set up in order to successfully execute your bots in the process.

[Configure scheduler user for AARI on the web](#) on page 929

Known limitations

If the Set action is used immediately after a Get action, the value assigned to a variable using the Get action is not retrieved in the specified form element of the Set action during bot runtime.

An AARI manager can create a request from a process that is assigned to them but not to their team. They can create and complete the request if the process contains only bot tasks. If the process contains a human task, the manager cannot assign the human task to themselves.

Workaround: Assign the process to both the manager and their team.

Discovery Bot

New features

View the duration of each recorded step

A recorded step is now displayed in minutes and seconds for the business user and analyst. Use this information to understand which steps are a bottleneck in the current process and will provide most benefit from automation. The step duration is displayed from the Recordings page (below the screenshot image), and from the View process and View opportunities page from the Preview pane window.

[Record a Discovery Bot business process](#) on page 968

Recorder enhancements

You can now perform actions such as double-click, drag-drop, click and hold, and text select when recording a business process.

[Record a Discovery Bot business process](#) on page 968

Changed features

Enhancement to the screenshot

The screenshot image of the recorded step is now increased to full size for a more clear, detailed view of the recorded step.

Fixed features	
Service Cloud case ID	Description
--	You can now click the Screen icon to display an image that you have hidden and saved. Previously, you had to click Screen and then click Save to display the image again.
--	When an opportunity is created for a system-generated view with filters applied, the filter now persists across the view displayed in the Aggregated tab from the Opportunities page. The filter is not reapplied on the view from the Opportunities page and the No recording data message is no longer displayed.
--	When you now cancel a recording, the recording is not displayed on the process tile in Process Cycle.
--	You can now approve a recording with 2000 steps. The Recording status is displayed as approved.

Known limitations
Double-click, drag-drop, and click and hold are not captured and displayed by the recorder on the Recordings page. To include these actions performed during the recording, you can document the individual steps in the Step description field for the analyst. Text selection using right-click or Ctrl+C and paste is captured and displayed by the recorder on the Recordings page.

Bot Insight

Fixed features	
Service Cloud case ID	Description
00669196	When you apply date filters on a dashboard and then apply an attribute filter in the widget, the system now filters by a specific date. Previously, the date filter applied at the dashboard level was ignored when the attribute filter was selected at the widget level. As a result, historical data was also displayed.

Sandbox environment

The sandbox environment for Enterprise A2019 Cloud enables you to test your production bots to ensure that these bots work seamlessly in your production environment. Use the sandbox environment to help plan and test new features for upcoming Enterprise A2019 releases.

Benefits

The sandbox environment is the same as any Enterprise A2019 Cloud instance but updates from the upcoming new release a few weeks before Automation Anywhere Cloud is updated.



Note: The sandbox environment should not be used as your production environment.

The sandbox environment helps Enterprise A2019 Cloud customers to perform these tasks:

- Test new features and identify any changes that might be required in your current bots.
- Preview upcoming features and enhancements.
- Better plan and manage changes for the upcoming update to your environment.

The sandbox environment is available only for Enterprise A2019 cloud and cloud-enabled deployments. The environment is not supported for an Enterprise Control Room in a data center that is hosted by you or a third-party vendor. The environment includes upcoming updates for Enterprise A2019, Discovery Bot, AARI, and Bot Insight.



Note: IQ Bot is not included in the sandbox environment.

Prerequisites

- You must have a valid Enterprise A2019 Cloud license to use the sandbox environment.
 - You must purchase an orderable sandbox SKU.
- Contact your Customer Success Manager (CSM) or Partner Enablement Manager (PEM) for more details.

Configure the environment

Perform the following tasks before you start using the sandbox environment:

1. De-allocate some of the licenses from your existing Enterprise A2019 instances and allocate these licenses to the sandbox environment.
2. Switch Bot agent to the sandbox environment.
[Switch Bot agent to a different Enterprise Control Room](#) on page 414
3. Create the required users, roles, and other Enterprise A2019 Cloud entities in the sandbox environment:
 - [Create a user](#) on page 1106
 - [Create and assign roles](#) on page 1110
 - [Credentials and lockers in the Credential Vault](#) on page 1099
4. Export bots from your existing Enterprise A2019 Cloud.

[Export bots](#) on page 1162

- Import the exported bots to the sandbox environment using Bot Lifecycle Management.

[Import bots](#) on page 1163

Enterprise A2019 feature comparison matrix

Use the feature comparison matrix to compare the Enterprise A2019 features with the features in Automation Anywhere Enterprise 11.3.x and 10.x versions.

- [Core components](#) on page 224
- [Bot development](#) on page 225
- [Bot extensibility and code reuse](#) on page 226
- [Integration capabilities](#) on page 227
- [Device utilization capabilities](#) on page 227
- [Recorder capabilities](#) on page 228
- [Bot packages](#) on page 228
- [Variables support](#) on page 230

Core components

	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Target user	Citizen Developer Specialist/RPA Developer IT	RPA Developer IT	RPA Developer IT
Delivery model	Software as a Service (SaaS) On-Premises	On-Premises Hybrid Cloud	On-Premises BotFarm (for Bot Runners)
Operating system	Microsoft Windows Linux (Linux CentOS 7.7, Red Hat Enterprise Linux 7.7)	Microsoft Windows	Microsoft Windows
Microsoft Active Directory support	Available (On-Premises)	Available	Available
SAML 2.0	Available	Available	Not available
Authenticated proxy support	Available	Not available	Not available
Localized user interface (UI)	15 plus languages	3 languages	Not available
Bot Insight support	Available	Available	Available (Basic)
IQ Bot support	Available	Available	Available (Basic)

	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Interactive forms (attended automation) support	Available	Not available	Not available
Bot Creator platform	Web-based	Thick client	Thick client
Bot Runner platform	Web-deployed	Thick client	Thick client
Attended bots	Available	Available	Not available
Unattended bots	Available	Available	Available
Upgrade to use new actions or commands	No upgrade required for Cloud Upgrade required for On-Premises	Upgrade required	Upgrade required
Automated queuing for job	Available	Available	Not available
Centralized licensing	Available (On-Premises)	Available	Available
High availability	Available	Available	Available
Load balancing	Available	Available	Available
Disaster recovery	Available	Available	Available
Multi-domain support	Available	Available	Available
Hosting technology	Java	Java	Microsoft IIS
Role-based access	Available	Available	Available
Power BI	Available	Not available	Not available
Tableau connector for Bot Insight	Available	Not available	Not available

Bot development

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
In-product learning	Available	Not available	Not available
Bot Creator Flow view	Available	Not available	Not available
Bot Creator Dual view	Available	Not available	Not available
Bot Creator Code view	Available	Available	Available
Bot Creator Visualize view	Not available	Available	Available
Actions search	Available	Not available	Not available
Advanced expressions	Available	Limited availability	Limited availability
Regular expressions	Available	Available	Available

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Remote device testing	Available (Develop on one device and test on another device)	Not available	Not available
Localized actions	Available	Not available	Not available
Collaborative development	Available	Not available	Not available
Bot Store integration	Available	Available (Version 11.3.3 and later)	Not available
Email triggers	Available	Available	Available
File and folder triggers	Available	Available	Available
Interface triggers	Available	Not available	Not available
MetaBot Logic	Available through TaskBot	Available	Available
MetaBot DLL	Available through DLL: Run function action	Available	Available
MetaBot Screen recalibration	Not available	Available	Available
Bot Lifecycle Management (BLM) - Import and export bots	Available	Available	Not available
Global values	Available	Not available	Not available
Bot cloning	Available	Not available	Not available
API deployment	Available	Available	Not available
Bot Runner sessions in Enterprise Control Room	Available	Available	Available
Packaging Bot dependencies	Available	Available	Available
Bypass legal disclaimer	Available	Available	Available

Bot extensibility and code reuse

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Custom actions in palette	Available (build using Package Development Kit)	Not available	Not available
Inline scripting	Available in Python, VBScript, and JavaScript	Not available	Not available

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Code reuse	Available for TaskBots, custom actions, and DLLs	Limited availability for MetaBots and DLLs	Limited availability for MetaBots and DLLs
Quick map for variables	Available	Available	Available

Integration capabilities

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Callouts using inline scripting	Available for Python, VBScript, and JavaScript	Not available	Not available
Enterprise Control Room APIs	Available	Available	Not available
REST Web Service	Available	Available	Available
SOAP Web Service	Available	Available	Available

Device utilization capabilities

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Workload management (WLM)	Available	Available	Not available
Device pools	Available for scheduling and WLM	Available in WLM only	Not available
Run-as users pool for automations	Available Set up multiple run-as users for device pools to provide effective license and device utilization	Not available	Not available
Background processing	Available	Not available	Not available
Non-persistent virtual desktop infrastructure (VDI)	Available	Available	Available

Recorder capabilities

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
AI Sense Recorder	Available	Available	Not available
Unified Recorder	Available	Not available	Not available
Recorder for Web/Windows	Available	Available	Available
Recorder for SAP	Available for 64-bit Version 750 Patch 9 or later	Available	Not available
Recorder for Citrix	Available - ICA Agent-based	Available	Not available
Recorder for Oracle	Available	Available	Not available
Secure recording	Available	Available	Available

Bot packages

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
AARI web	Available	Not available	Not available
Active Directory	Available	Available	Available
Analyze	Available	Not available	Not available
Application	Available	Available	Available
App Integration	Available	Available	Available
Boolean	Available	Not available	Not available
Bot migration	Available	Not available	Not available
Browser	Available	Not available	Not available
Clipboard	Available	Available	Available
Comment	Available	Available	Available
Credential Vault	Available	Available	Available
CSV/TXT	Available	Available	Available
Data Table	Available	Available using Array type variable	Available using Array type variable
Database	Available	Available	Available
Datetime	Available	Not available	Not available
Delay	Available	Available	Available
Dictionary	Available	Not available	Not available

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
DLL	Available	Limited availability through MetaBots	Limited availability through MetaBots
Email	Available (SMTP, EWS, and Outlook)	Available (SMTP, EWS)	Available (SMTP)
Error handler	Available (Advanced - Try, Catch, Finally, Throw)	Available (Basic)	Available (Basic)
Excel advanced	Available	Limited availability	Limited availability
Excel basic (without Excel)	Available	Not available	Not available
File operations	Available	Available	Available
Folder operations	Available	Available	Available
FTP / SFTP	Available	Available	Available
If	Available	Available	Available
Image Recognition	Available	Available	Available
Interactive form operations	Available	Not available	Not available
IQ Bot	Available	Available	Available
IQ Bot Pre-processor	Available	Not available	Not available
IQ Bot (Local Device)	Available	Not available	Not available
JavaScript	Available	Available through Run Script	Available through Run Script
Legacy Automation	Available	Not available	Not available
Legacy Support	Available	Not available	Not available
List operations	Available	Not available	Not available
Log To File	Available	Available	Available
Loop	Available	Available	Available
Message Box	Available	Available	Available
Mouse	Available	Available	Available
Number	Available	Not available	Not available
OCR	Available	Available	Available
Office 365 Calendar	Available	Not available	Not available
Office 365 Excel	Available	Available (Desktop)	Not available
Office 365 OneDrive	Available	Not available	Not available
One Drive	Available	Not available	Not available
PDF	Available	Available	Available

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
PGP	Available	Available	Available
Ping	Available	Not available	Not available
Play Sound	Available	Available	Available
Printer	Available	Available	Available
Prompt	Available	Available	Available
Python Script (Inline)	Available	Not available	Not available
Recorder	Available	Available	Available
REST Web Service	Available	Available	Available
SAP support	Available (Native)	Limited availability through MetaBots	Limited availability through MetaBots
SAP BAPI	Not available	Available	Available
Screen	Available	Available	Available
Services	Available	Available	Available
Simulate keystrokes	Available	Available	Available
SNMP	Available	Available	Available
SOAP Web Service	Available	Available	Available
Step	Available	Not available	Not available
String	Available	Available	Available
System	Available	Available	Available
TaskBot	Available	Available	Available
Terminal Emulator	Available	Available	Available
Trigger Loop	Available	Not available	Not available
VBScript (Inline)	Available	Not available	Not available
Wait	Available	Available	Available
Window	Available	Available	Available
Workload	Available	Available	Not available
XML	Available	Available	Available

Variables support



Important: When you migrate from Enterprise versions 11.3.x or 10.x to Enterprise A2019, some variables are mapped directly while some contain a different configuration.

Variable	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Application variables			

Variable	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Analytics	Available	Available	Not available
ArrayRows	Available through Recursive expressions	Available	Available
ArrayColumns	Available through Recursive expressions	Available	Available
Clipboard	Available	Available	Available
Credential	Available	Available	Not available
Dictionary	Available through Dictionary package	Available	Not available
Enter (String variable)	Available	Available	Available
Prompt Assignment (user-defined)	Available	Available	Available
Read from Excel/CSV	Available through Excel advanced package	Available through Array type user-defined variable	Available through Array type user-defined variable
Read from database	Available through Data Table package	Available through Array type user-defined variable	Available through Array type user-defined variable
Read from text file	Available through Boolean, Datetime, Number, and String packages	Available through Array, List, and Value type user-defined variables	Available through Array, List, and Value type user-defined variables
Separator (String variable)	Available	Available	Available
Tab (String variable)	Available	Available	Available
Work Item	Available	Available	Not available
System variables			
AAApplicationPath	Available through global values	Available	Available
AADefaultDateFormat	Available through global values	Not available	Not available
AAInstallationPath	Available	Available	Available
AATaskExecutor	Not available	Available	Not available
AATaskName	Available	Available	Not available
AAControlRoom	Available	Available	Not available
Counter	Available through Number and Loop packages	Available	Available
CPUUsage	Available	Available	Available
CurrentDirectory	Available through Loop package	Available	Available

Variable	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
DatasetColumn	Available through Loop package	Available	Available
Date	Available	Available	Available
Day	Available	Available	Available
Email (includes EmailFrom, EmailMessages, EmailReceivedDate, EmailReceivedTime, EmailSubject, and EmailTo)	Available through Email, Dictionary, and Loop packages	Available	Available
ErrorLineNumber	Available through Error handler package	Available	Available
ErrorDescription	Available through Error handler package	Available	Available
Excel (includes ExcelColumn, ExcelCell, ExcelCellColumn, and ExcelCellRow)	Available through Excel advanced package	Available	Available
Extension	Available through Loop package	Available	Available
FileDataColumn	Not available	Available	Available
FileName	Available through File package	Available	Available
FolderName	Available through Folder package	Available	Available
Hour	Available	Available	Available
Machine	Available	Available	Available
Millisecond	Available	Not available	Not available
Minute	Available	Available	Available
Month	Available	Available	Available
OSName	Available	Available	Available
PDF (includes PDFFileName, PDFTitle, PDFAuthor, and PDFSubject)	Available through PDF, Dictionary, and Loop packages	Available	Available
RAMUsage	Available	Available	Available
Second	Available	Available	Available
TableColumn	Not available	Available	Available
TotalRAM	Available	Available	Available

Variable	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Trigger	Available through Interface trigger	Available	Available
Year	Available	Available	Available
XMLDataNode	Not available	Available	Available

Related concepts

[Enterprise A2019 Release Notes](#) on page 9

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

[Package Software Development Kit \(SDK\)](#) on page 989

Review the requirements and process for creating and uploading an action package to your Enterprise Control Room.

Related reference

[Operating system, environment, and platform supported for Enterprise Control Room](#) on page 295

Enterprise A2019 can be hosted on AWS, Microsoft Azure, Google Cloud Platform, IBM, and any public, private, or hybrid cloud service that meets the Enterprise Control Room and Bot agent hardware and software requirements.

[Enterprise A2019 FAQ](#) on page 239

For details and questions on the latest Automation Anywhere platform, Enterprise A2019, review this FAQ.

[Variable mapping for migration](#) on page 482

Some variables map directly from previous product versions to A2019 while others behave differently or contain configuration changes.

[Global values](#) on page 882

Global values enable users to reuse identical values between bots instead of creating new variables for each bot. A user with the `AAE_admin` role configures a global value with a default value and can enable non-admin users to overwrite the value to use in their bots.

[Recursive expressions](#) on page 874

Use a recursive expression to insert a variable in the place of an index or key of a dictionary, list, record, or table variable.

IQ Bot A2019 feature comparison matrix

Compare the key features of IQ Bot A2019 deployment models and review the feature parity with the latest IQ Bot 11.3.x release.

IQ Bot basic features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Prebuilt domains	Yes	Yes	Yes Supported domains include: • Invoices • Purchase orders • Bank statements • Credit memo • Utility bills	Yes
User confidence threshold	Yes	No	No	Yes
Learning instance creation/editing/renaming	Yes	Yes	Yes	Yes
Document image preprocessing	Yes	Yes	Yes	Yes
Document image classification	Yes	Yes	Yes	Yes
Document image OCR	Yes	Yes	Yes	Yes
Google Vision OCR	Yes	Yes	Yes	Yes
Tegaki API OCR engine	Yes	No	No	Yes
MICR (magnetic ink character recognition) extraction	Yes	Yes	Yes	Yes
PDFBox Toggle	Yes	Yes	Yes	Yes
Caching (enhanced performance)	Yes	Yes	Yes	Yes
Bot limiting	Yes	Yes	No	Yes
Bot creation/editing/deletion	Yes	Yes	Yes	Yes
Designer/Preview/Test	Yes	Yes	Yes	Yes
Production toggle	Yes	Yes	Yes	Yes
Validator	Yes	Yes	Yes	Yes

IQ Bot basic features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
CSV output files	Yes	Yes	Yes	Yes
Learning instance import/export	Yes	Yes	No	Yes

Domain/training features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Web-based UI	Yes	Yes	Yes	Yes
Domain import/export	Yes	Yes	No	Yes
Hover over text segment to view OCR	Yes	Yes	Yes	Yes
Resize mapped box in Designer	Yes	Yes	Yes	Yes
Delete mapped box in Designer	Yes	Yes	Yes	Yes
Populate text in End of table/section indicator	Yes	Yes	Yes	Yes
Single click to extract text in the Validator	Yes	Yes	Yes	Yes
Document group description	Yes	Yes	Yes	Yes
See extraction results action displays list of all training documents in an alphanumeric sequence	Yes	Yes	Yes	Yes
InstallShield patch installer with simplified upgrade/downgrade for IQ Bot	Yes	No	No	Yes
OCR Pre-processing Settings configuration	Yes	No	No	Yes

Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Original IQ Bot text segmentation/document classifier from IQ Bot Version 5.3.0/6.0	Yes	No	No	Yes
New IQ Bot text segmentation/ document classifier from IQ Bot Version 5.3.1/6.5	Yes	Yes	Yes	Yes

Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Option to select classifier version of existing learning instances during IQ Bot upgrade: - Version 1 (IQ Bot 5.3.0 or before 6.0) - Version 2 (IQ Bot 5.3.1/ Version 6.5 Beta)	Yes	No	No	Yes
Enhanced compatibility with ABBYY FineReader Engine 12.2 Plugin	Yes	Yes	Yes	Yes
Automated installation of ABBYY FineReader Engine 12.2 Plugin	Yes	Yes	Yes	Yes
Validator auto-correction	Yes	Yes	Yes	Yes
Check box extraction	Yes	Yes	Yes	Yes
Check box auto-detection	Yes	Yes	Yes	No
Advanced extraction: Repeated tables/sections; linking tables/sections; map some header-less columns	Yes	Yes	Yes	Yes
Alternative to stop extraction at End of table/section indicator	Yes	Yes	Yes	Yes
Select text segments that enclose or are enclosed by other text segments	Yes	Yes	Yes	Yes
Option to select default training document	Yes	Yes	Yes	Yes
Formula validation	Yes	Yes	Yes	Yes
List validation in UI	Yes	Yes	Yes	Yes
List validation through external file	No	No	No	No
File/folder search validator	Yes	Yes	Yes	Yes
Microsoft Azure Computer Vision API (OCR)	Yes	Yes	Yes	Yes
Add user logic in the Designer	Yes	Yes	Yes	Yes
View and test all documents in the Designer > See extraction results	Yes	Yes	Yes	Yes

Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
IQ Bot extensions	Yes	No	No	Yes
Import standard form domains	Yes	Yes	No	Yes
(Beta) Enabled data capture and OCR using Google Vision API for Asian languages	Yes	Yes	Yes	Yes
Magnetic ink character recognition (MICR) extraction	Yes	Yes	Yes	Yes
Option to turn off PDFBox as OCR engine	Yes	Yes	Yes	Yes
Using variables in IQ Bot package	Yes	Yes	Yes	No
Extraction results opening in a new browser tab	Yes	Yes	Yes	No

Enterprise features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Access IQ Bot without device license (without Bot Creator or Bot Runner license)	Yes	Yes	Yes	Yes
Access IQ Bot as Validator users without Bot Creator or Bot Runner license	Yes	Yes	Yes	Yes
Database encryption	Yes	Yes	Yes	Yes
Roles-based access (RBAC) for new learning instances	Yes	Yes	No	Yes
Audit logs	Yes	Yes	No	Yes
Windows authentication	Yes	Yes	No	Yes
Azure PaaS Database Service	Yes	No	No	Yes
Counter for number of uploaded pages in production	Yes	Yes	No	Yes
API access	Yes	Yes	Yes	Yes
Access IQ Bot without sysadmin role that includes support for Amazon Relational Database Service (RDS) out of the box	Yes	No	No	Yes

Enterprise features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Migrate learning instances as other learning instances are being edited	Yes	Yes	No	Yes
Migration Utility UI	Yes	Yes	No	Yes
Internationalization	Yes	Yes	Yes	Yes
UI Localization: - Chinese Simplified - Chinese Traditional - French - German - Japanese - Korean - Spanish - Italian - Portuguese	Yes	Yes	Yes	Yes

Enterprise A2019 packages	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
IQ Bot Classifier package	Yes	Yes	No	No
IQ Bot [Local Device] package	Yes	Yes	Yes	No
IQ Bot Pre-processor package	Yes	Yes	Yes	No
IQ Bot Extractionpackage	Yes	Yes	No	No

Related information

[IQ Bot feature comparison matrix](#)

IQ Bot A2019 version compatibility

Review the version compatibility information before you upgrade from an earlier version of IQ Bot A2019 to the latest IQ Bot A2019 version, or from earlier versions of IQ Bot to IQ Bot A2019.

Compatibility with A2019 Enterprise Control Room

Review the information on IQ Bot A2019 version compatibility with A2019 Enterprise Control Room:

IQ Bot A2019 On-Premises	Enterprise Control Room
Build 8098	Build 8098 (A2019.19)
Build 7554	Build 7560 (A2019.18)

IQ Bot A2019 On-Premises	Enterprise Control Room
Build 7082	Build 7103 (A2019.17)
Build 6443	Build 6463 (A2019.16)
Build 5931	Build 5933 (A2019.15)
Build 5322	Build 5322 (A2019.14)
Build 4695	Build 4705 (A2019.13)
Build 4088	Build 4105 (A2019.12)
Build 3337	Build 3337 (A2019.11)
Build 2545	Build 2545 (A2019.10)
Build 2079	Build 2079
Build 1610	Build 1610
Build 1089	Build 1089
Build 550	Build 550

Compatibility with earlier IQ Bot versions

Review the following version compatibility table to understand the available upgrade options for IQ Bot A2019:

IQ Bot version	IQ Bot A2019 (On-Premises)
Version 11.3.4.x	Yes
Version 11.3.3.1	Yes
Version 6.5.2	Yes
Version 6.5	Yes
Version 6.0	Yes
IQ Bot 5.3.1	Yes

Enterprise A2019 FAQ

For details and questions on the latest Automation Anywhere platform, Enterprise A2019, review this FAQ.

What is Enterprise A2019?

Enterprise A2019 delivers a browser-based, intuitive experience for business users to easily automate tasks and powerful tools for developers to build process automation, delivering security, governance, and control on a scalable infrastructure for IT.

What is included in Enterprise A2019?

Everything to build the bots you need to automate your business processes: Control Room cluster, Bot editor, Bot Runner, Universal Recorder, Enterprise-grade security certifications,

How is Enterprise A2019 deployed?

support, access to the Bot Store, and courses on Automation Anywhere University.

Enterprise A2019 can be deployed On-Premises as well as in the Cloud.

For Enterprise A2019 On-Premises deployment, the installation is on the customer's servers. With the web-based nature of the Bot Creator, there is no installation or deployment required on the user machines, resulting in a significant reduction in total cost of ownership (TCO).

For Enterprise A2019 deployed in the Cloud, the platform is available as a true software-as-a service (SaaS) experience. Automation Anywhere offers this SaaS experience as a turnkey solution where the buyers do not have to worry about choosing the cloud provider, or any other infrastructure elements— Automation Anywhere takes care of it all. Admins get the complete set of features for user management, security, governance, and control that they also access through a web browser. The end users can then access the platform using their browser, log in, and start creating their bots.

What additional cloud hosting options are available?

Enterprise A2019 can be hosted on AWS, Microsoft Azure, Google Cloud, IBM, and any public, private, or hybrid cloud service.

What scripting languages does Enterprise A2019 support?

Enterprise A2019 supports JavaScript, Python, and VBScript.

Is Enterprise A2019 available in languages other than English?

Yes, Enterprise A2019 is available in 10 languages: English, French, German, Italian, Japanese, Korean, Portuguese, Spanish, Simplified Chinese, and Traditional Chinese.

How is Enterprise A2019 updated?

For Cloud deployed Enterprise A2019, customers are always on the latest version with updates rolled out by Automation Anywhere on a regular basis. For features such as action packages, admins and users have the ability to test the latest packages before choosing to accept the update.

For On-Premises customers, regular updates are made available through the customer portal, providing admins an opportunity to keep their business-wide installation on the version of their choice.

What are some of the data privacy and security aspects of Enterprise A2019?

Automation Anywhere Enterprise Cloud privacy is engineered with a comprehensive set of security features that either automatically provide or are configurable by the data owner to provide data protection. Automation Anywhere Enterprise Cloud includes comprehensive security and encrypts data both in transit and at rest. No personal data is goes outside of the environment—unless you tell it to;

	it remains completely under the control of the IT manager.
	To ensure customers can trust the AAI Enterprise Cloud, Automation Anywhere Enterprise Cloud services are secured based on industry standards and frameworks like NIST Cybersecurity Framework, AWS Cloud Adaption Framework, Center for Information Security (CIS) baselines, and others.
Is Automation Anywhere Cloud highly available?	Automation Anywhere Cloud is deployed using fully load balanced Control Room environments of Enterprise A2019 deployed on fully HA public cloud infrastructure services within a region.
Is Automation Anywhere Cloud protected with disaster recovery?	Backups are taken daily to another region (except Australia where backups are kept in country). If a disaster is declared for the primary region, then a secondary region is instantiated for all tenants using the daily backup. The current objectives for this recovery are: • RTO (Recovery Time Objective): Time to get a new region up and running with the last backup data restored = 6 hours. • RPO (Recovery Point Objective): The maximum duration for data loss during a restore = 24 hours.



Note: A DR region might be in a different country.

Related concepts

[Enterprise A2019 Release Notes](#) on page 9

Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

About Automation Anywhere Enterprise A2019

The Automation Anywhere Enterprise Digital Workforce platform is the foundation to deliver the automation of complex business work securely and at scale.

Overview

Enterprise A2019 is an industry-leading RPA and digital workforce platform that combines an easy-to-use user interface with enterprise-class reliability and the security to enable real-time self-automation. It delivers a browser-based, intuitive experience for business users to quickly automate tasks and tools for developers to build process automation. Enterprise A2019 provides both On-Premises and Cloud deployment options and is the first platform that provides RPA-as-a-Service as an automation solution. It enables users to automate applications across different infrastructures and industries such as banking, telecommunications, and business process outsourcing (BPO) organizations.

Enterprise A2019 provides capabilities such as the following:

- An intuitive interface to create a bot and design business process automation workflows.
- Support for multiple operating systems including Windows, Linux, and MacOS.
- Different views of bot to facilitate collaboration: flow view for business users, list view for developers, and dual view for collaboration.
- Recorder that works across various platforms such as Microsoft Windows, Citrix, Web, and SAP.
- Advanced variables capabilities and support for JavaScript, Python, and VBScript.
- A flexible architecture that enables you to add new command packages.

Enterprise A2019 components

Automation Anywhere Robotic Interface (AARI)

AARI is an easy-to-use interface that enables business users to collaborate with bots. Users can start process automations, provide feedback to bots to resume processes, and escalate requests to additional users for downstream processing. AARI enables the enterprise to unlock new automation opportunities between humans and bots that RPA could not previously address.

[Get started with AARI](#)

Discovery Bot

An intelligent business solution for enterprise businesses that provides capabilities for end users to discover opportunities for automation using process discovery. Discovery Bot focuses on process automation by capturing document processes, identifying opportunities from business centric processes, and prioritizing opportunities based on ROI, and create bots automatically. Discovery Bot aligns business workers to uncover automation opportunities that can optimize the return on your RPA investment.

[Process Discovery using Discovery Bot](#) on page 951

IQ Bot

An intelligent document processing solution that can read and process various complex documents and emails. IQ Bot combines RPA with multiple AI techniques to intelligently capture, classify, and extract semi-structured and unstructured data, allowing document-centric business processes to be automated end-to-end.

[Install and update IQ Bot A2019](#) on page 422

Bot Insight

The analytics platform that provides real-time, interactive, and smart insights about business processes and operational intelligence. Bot Insight uses the large amount of content-level and productivity data that the deployed bots generate and translates the data into insights through automatically generated and customizable dashboards.

Bot Store

[Business analytics through Bot Insight](#) on page 1315

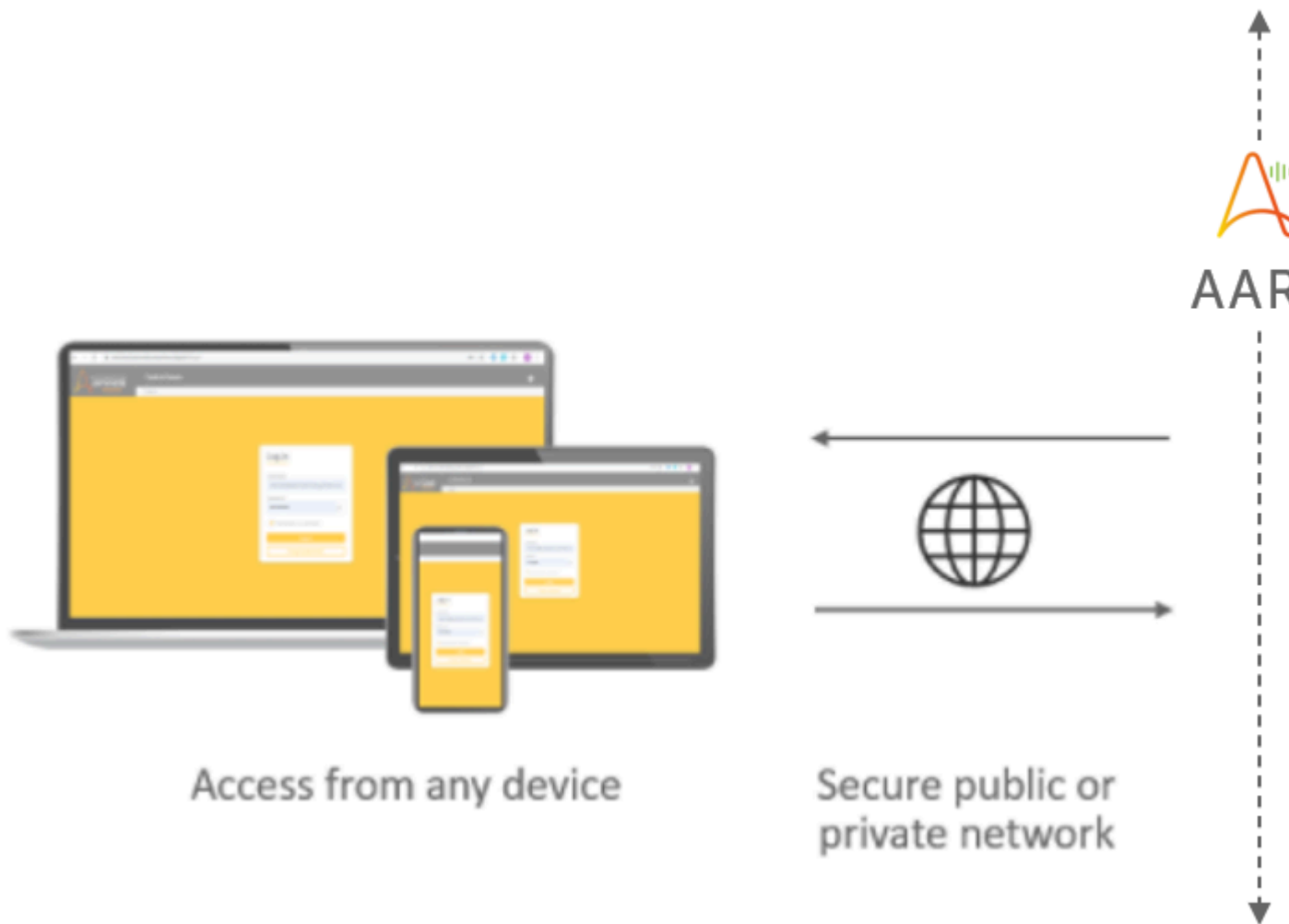
Online marketplace for pre-built bots and Digital Workers that run on the Automation Anywhere Enterprise platform. Access Bot Store directly from the Enterprise Control Room to download or submit bots and packages.

[Bot Store](#) on page 1154

Private Bot Store A secure internal bot marketplace for a company to post and share details and documentation for all internally developed bots. Employees can easily discover internal bots and commands to reuse in addition to all of bots from the Automation Anywhere Bot Store.

[Private Bot Store](#) on page 252

The following image shows the components of Enterprise A2019:



Benefits

Faster time to value

- Instant web-based deployment that enables you to start developing bots quickly
- An intuitive interface that enables users with varying skill levels to easily use the product and speed up the learning process
- Easy collaboration between business, process, and IT

Business agility

- Regular updates to stay up-to-date on any device anywhere
- Business continuity with high availability and disaster recovery
- Scalability

Lowest total cost of ownership (TCO)

- No additional infrastructure investment required

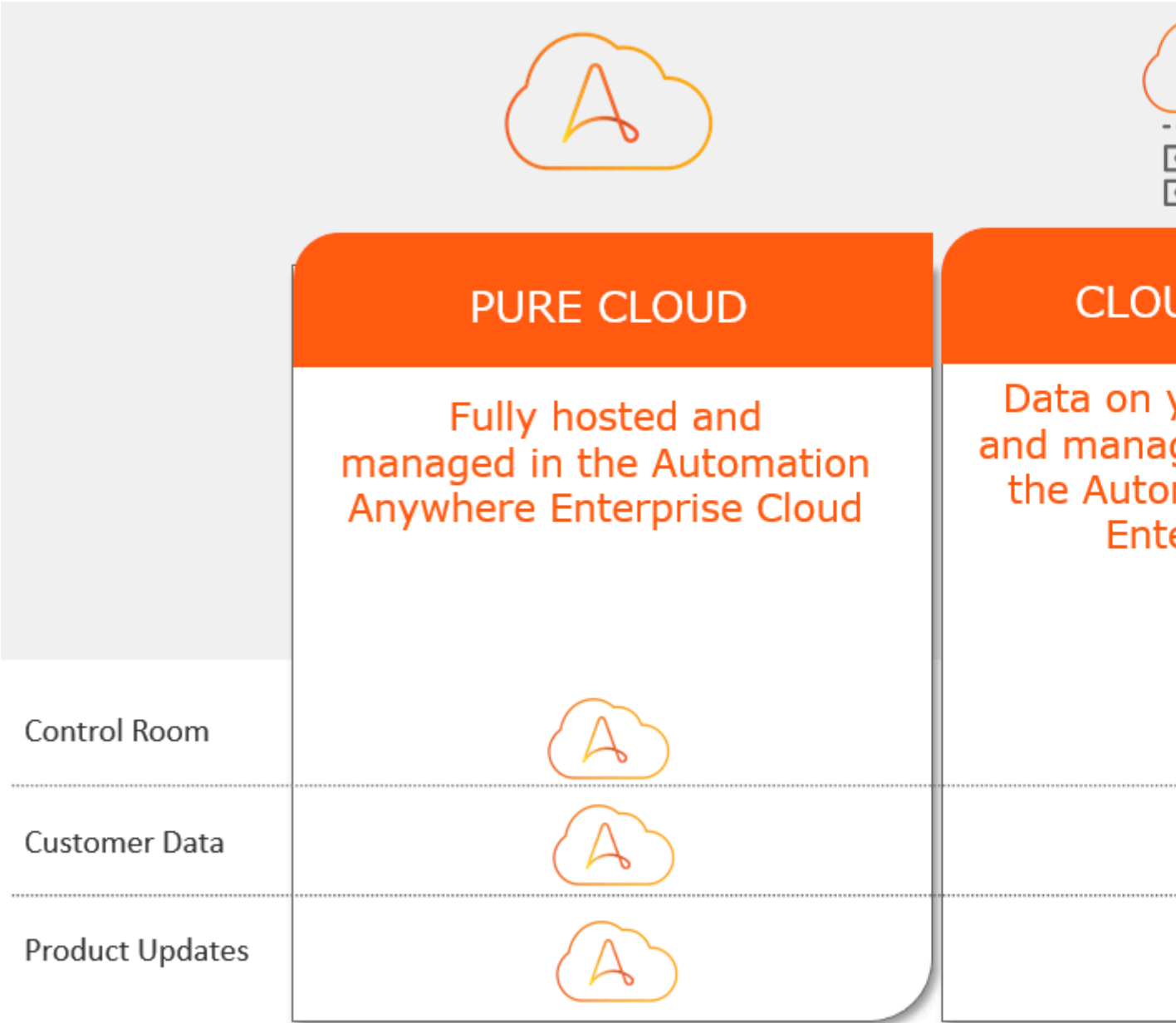
- Single platform across front office, back office, and employee applications
- Reduced maintenance cost

Deployment models

Enterprise A2019 provides the following deployment models:

Pure Cloud	Fully hosted and managed in Automation Anywhere Enterprise Cloud. This deployment model provides full SaaS experience with instant access to a complete platform that is secure, always up-to-date, and requires zero infrastructure.
Cloud-Enabled	Offers a SaaS experience while data is hosted On-Premises with lower total cost of ownership (TCO). This deployment model is suitable for customers who have to adhere to strict regulatory norms where data sovereignty is mandatory.
On-Premises with updates through Cloud	Fully On-Premises deployment with control over receiving updates and new capabilities from the Cloud.

The following image shows the deployment models for Enterprise A2019:



Related information

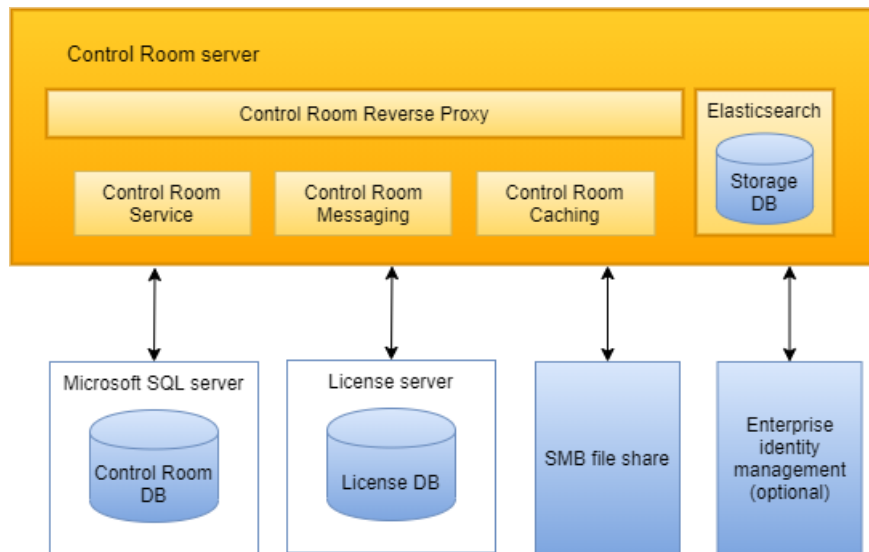
- [Automation Anywhere Enterprise RPA Platform](#)
- [What is RPA?](#)
- [RPA for Business Process Outsourcing \(BPO\)](#)
- [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#)

Enterprise Control Room overview

The Enterprise Control Room manages, schedules, executes, and configures various capabilities of bots and Bot Runners using a collection of specialized web services.

Components

The Enterprise Control Room is a centralized management point for all bots. A reverse proxy is responsible for listening for remote connection requests and forwarding those requests to the correct specialized service. The following figure shows the Enterprise Control Room components and general data center interaction.



In the data center, Enterprise Control Room is installed on a server and configured to interact with the other data center components.

The Enterprise Control Room includes objects that performs the following:

- Enterprise Control Room reverse proxy is managed through the following functions:
 - Enterprise Control Room services
 - Enterprise Control Room messaging
 - Enterprise Control Room caching
- Elasticsearch
- Licensing

The Enterprise Control Room required data center components include:

- An SQL server with an Enterprise Control Room database.
- A Server Message Block (SMB) file share

Centralized Automation Deployment

- Enterprise Control Room acts as the single point of access and control for bot execution.
- Enterprise Control Room provides bot upload and download features to facilitate seamless collaboration for end to end business process automation by multiple users.

- All scheduling is managed by the Enterprise Control Room. Bots are deployed on the Bot Runners either ad hoc or on pre-defined schedules. Once the schedules are created, Enterprise Control Room automatically and intelligently picks up the subsequent updates to bots, without any need to alter automation schedules.

Centralized Access Control

- Least Privilege and Access controls user access. They are implemented in the Enterprise Control Room through Role Based Access Control (RBAC).
- All Users and Roles are created and managed from the Enterprise Control Room.

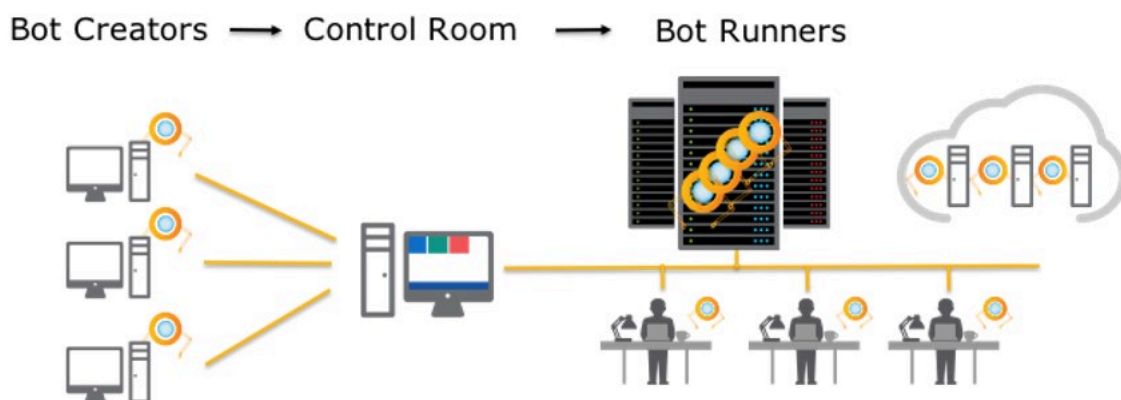
Collaboration Centralized Workforce Management

- Enterprise Control Room dashboards provide a single view of the entire automation infrastructure.
- Enterprise Control Room receives real time heartbeat and telemetry from automations with events, exceptions and alerts.
- Unauthorized users cannot pause, resume or stop any of the ongoing automations on any Bot Runner.
- All historical automation data is logged in and available through Enterprise Control Room Audit Logs.

Distributed Architecture

Automation Anywhere platform is deployed using a distributed architecture.

Centralized management is accomplished via a web-based server, called the Enterprise Control Room, to manage all development and execution of the digital workforce. The Enterprise Control Room is connected to Bot Creators and Bot Runners. Bot Creators are development systems used for authoring and tailoring of automations. Bot Runners execute the automations; they are run-time systems installed on machines. Bot Runners can be deployed on desktops, on virtual machines in data centers or cloud.

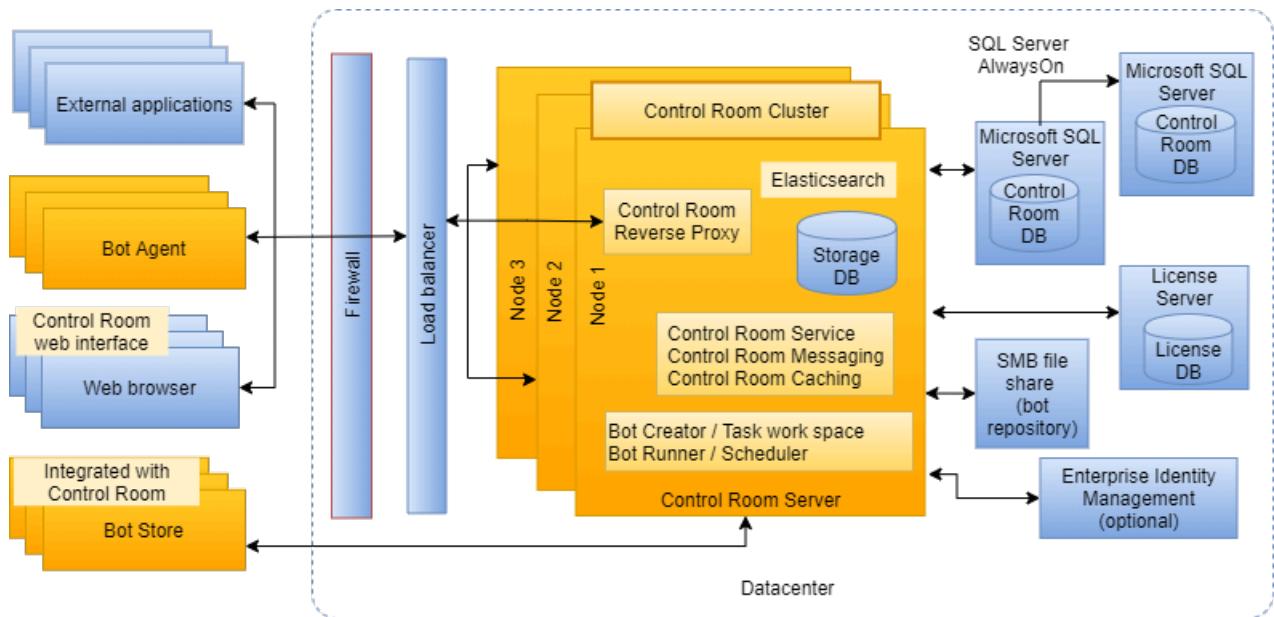


Distributed architecture with HA/DR support

The Automation Anywhere Enterprise self-contained platform within the customer environment mitigates the risk of "cross-contamination" from an unlikely event of a security breach from another network.

Automation Anywhere Enterprise supports distributed architecture to deliver the optimal performance and security. Following are the main distributable components of Enterprise Control Room which can be clustered to achieve High Availability (HA)

Figure 1: Distributed Mode



Distributed Cache

Enterprise Control Room architecture uses distributed cache to update all other nodes as soon as any information is updated in one of the nodes. This ensures fastest data synchronization across all the nodes and delivers seamless user experience. Automation Anywhere Enterprise platform uses clustering mechanism to implement distributed cache, to synchronize all data operations. For example, when the Credential Vault is opened from one node, it is automatically opened for all other nodes too.

Related concepts

[High availability and disaster recovery deployments](#) on page 321

High availability (HA) provides a failover solution if an Enterprise Control Room service, server, or database fails. Disaster recovery (DR) provides a recovery solution across a geographically separated distance in the event of a disaster that causes an entire data center to fail.

Network Architecture and Boundary Controls

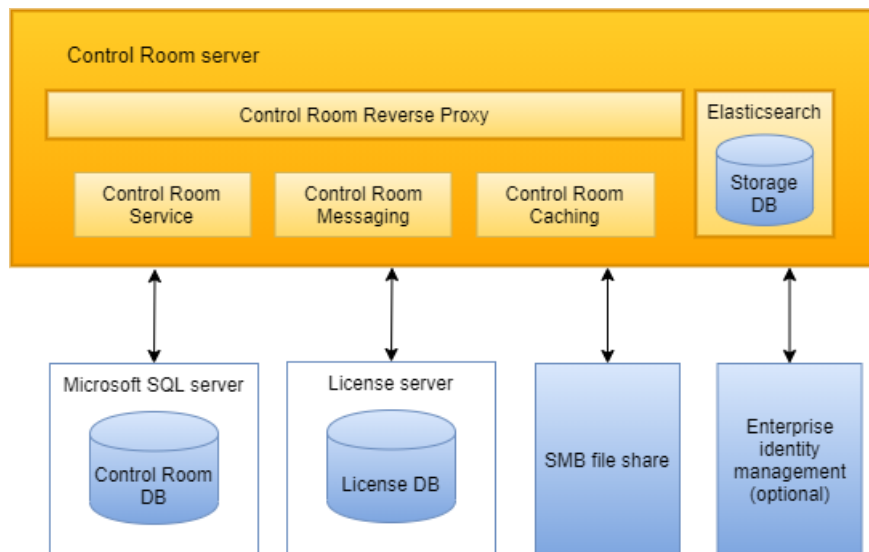
Communication between authorized and authenticated Bot Creators, Bot Runners, and the Enterprise Control Room use secure protocols and pass through a network firewall and a load balancer.

All communication between authorized and authenticated Bot Creators, Bot Runners, and the Enterprise Control Room use secure protocols and pass through a network firewall and a load balancer, based on customer deployment topology consistent with best practices as defined by NIST SC-7 Boundary

Protections that require connections to networks only through managed interfaces using devices such as firewalls and load balancers.

All communications are denied by default and only allowed through specific services:

- Secure protocols, such as TLS 1.2, HTTPS, are used to communicate between different registered devices and Enterprise Control Room servers.
- Real time Data Service is a common service for all Application Servers. It receives and broadcasts real time task progress data coming from each running Bot Runner. It plays a mediator role between browser where Enterprise Control Room is opened and a Bot Runner where task is running.
- Shared File Repository is a file system location where all the bots reside physically. It is shared across all the Application Servers, so that same repository view and operations become possible.
- Data tier can be configured for failover cases separately if high availability is concerned.
- All network connections are terminated at the conclusion of each session or within a specified time period.



Introducing Automation Anywhere Robotic Interface (AARI)

Automation Anywhere Robotic Interface or AARI provides a simple, front-end interface for users to execute and interact with bots and applications.

Use AARI from within applications such as Salesforce and within browsers and desktops for end-to-end process automation across the enterprise by connecting bots in the front and back offices.

Get started with AARI

AARI provides various interfaces that you can use to connect to business workflows at multiple touchpoints. Access AARI in the following ways:

- Web browser

Access AARI through a URL to manage front and back office functions, gathering input and approval from a single interface.

[Using AARI on the web](#) on page 920

- Desktop

Retrieve and update data with custom forms. Users can view and interact with all data from a single screen instead of switching between multiple systems.

[Get started with AARI desktop](#) on page 930

- Applications

Execute bots from common enterprise applications such as Salesforce, Microsoft Excel, and G Suite through an embedded Automation Anywhere toolbar.

- [RPA Bots for Salesforce](#)
- [RPA Bots for Excel](#)
- [RPA Bots for G Suite](#)

- Mobile app

Start and stop bots and view analytics on your mobile device with the Automation Anywhere Mobile app.

[Automation Anywhere Mobile app](#) on page 276

Attended and unattended automation

The Automation Anywhere RPA platform provides attended and unattended automation for users to create bots that can manage routine tasks efficiently. While users focus on critical inputs that require manual overview or approval, bots handle tasks such as gathering information across databases, validating data, or responding to chats.

Overview

Collaboration between humans and software bots is called attended automation. As attended automation requires user supervision, it is best suited for use with smaller and more fragmented tasks. However, some tasks within a business process do not change a lot over time and might not require extensive user intervention, such as collecting data or retrieving information from multiple databases. When such tasks that require little or no user judgment are configured to trigger other bots, it is called unattended automation. Unattended automation is useful to perform privileged operations, requiring elevated permissions and credentials.

Enterprise A2019 offers a combination of attended and unattended automation for a complete RPA solution with the following benefits:

- Automated integration between multiple applications or databases, reducing errors as very little user intervention is necessary.
- Access bots in real-time through an easy to use interface.
- Users can set up or change triggers to start bots based on real-time.

Related concepts

[Get started with AARI desktop](#) on page 930

Use Automation Anywhere Robotic Interface (AARI) through your desktop to manage routine tasks such as validating data, retrieving approvals, and managing escalations through bots.

Private Bot Store

Private Bot Store is a secure internal bot marketplace for a company to post and share details and documentation for all internally developed bots. Employees can easily discover internal bots and commands to reuse in addition to all of the bots from the Automation Anywhere Bot Store vendors.

Use Private Bot Store to perform the following tasks:

- View, access, and reuse bots to automate processes:
 - Find and reuse bots built by your team
 - Use filters to search for bots by applications, business processes, or a keyword
 - Use bots from the Automation Anywhere Bot Store vendors
 - Review detailed documentation provided with each bot to decide whether to use the bot
- Submit details and documentation about your own bots
- Use the Suggested bot idea page to submit a bot idea

Use bots within your company:

- If required, email a bot developer for bot installation assistance
- Access bots in your Enterprise Control Room
- Review and access your bots from the My Bots and My Submissions pages

Use admin tools to help you with the following tasks:

- Review, approve, and publish bots
- Review your team's bot use case ideas
- Add or remove users and assign permissions

Watch the following video on how to get started with Private Bot Store:

<https://www.youtube.com/embed/ZE5hxVQw-tY>

Related concepts

[Getting started with Private Bot Store](#) on page 1156

Use Private Bot Store to view and submit bots and bot use cases within your company. Use admin tools to review and publish bots and manage users.

Security architecture

Many of the largest financial organizations in the world rely on Automation Anywhere's secure digital workforce platform to automate security-sensitive operations.

The platform's security architecture is founded on Least Privilege principles and a strict Separation of Duty model with 41 technical controls implemented across seven NIST 800-53r4 Control Families. Controls are applied across three components: the Enterprise Control Room, Bot Creators (development systems), and Bot Runners (bot execution run times) through the bot life cycle from creation through decommissioning. This security architecture and the underlying controls are mapped to industry best practices as defined by NIST and can be readily mapped to other frameworks, for example, CoBIT (SOX) and ISO 27002.

Access Controls. Automation Anywhere Enterprise (AAE)

Access Controls. Automation Anywhere Enterprise (AAE) limits and controls human and bot access to logical resources across components.

- Two independent control planes enforce least privilege. Only developers are enabled to read or write, only authorized Enterprise Control Room users to execute automations, (Enterprise Control Room authorizes and executes) subject to fine-grained Role Based Access Controls (RBAC) down to individual automations (bot), Bot Runners and domains.
- Bot-level Separation of Duty is enforced. Each bot is obfuscated and executed by its corresponding authorized Bot Runners.
- Bot execution is controlled via RBAC. Domain privileges are defined across groups of bot and Bot Runners.
- Security at-rest and in-transit. All access credentials are secured at-rest via a central credential vault with support for third-party credential stores. All communications are secured in-transit via SSL and TLS.

Configuration management

Configuration management is controlled at both bots and Bot Runner levels.

- The Enterprise Control Room authorizes, enforces, and logs changes to all Bot Creators and Bot Runners.
- Bot change control on execution is enforced through encryption and authentication.

Identification and authentication

Identification and authentication is controlled through Microsoft Windows authentication services.

- Bot Creators use [Active Directory](#) for authentication
- Bot Runners have two levels of authentication, one for autologin authentication of the runner and the other for execution of bots.
- Credentials are secured at-rest and in-motion through the Credential Vault or integration with third-party products.

Risk assessment

Risk assessment is undertaken on Static, Dynamic, and Network-based Vulnerability Assessments. Audit and Accountability are established through event capture, logging and auditing on all three components with granular event capture at the bot level and nonrepudiation. Bot Insight embedded analytics provides near-real-time Incident Response and integration with Security Event and Information Management systems.

Related information

[Enterprise RPA Security](#)

Security architecture model

Automation Anywhere Cognitive security architecture is founded on Least Privilege principles and a strict Separation of Duty model with 41 technical controls implemented across seven NIST Control families.

The NIST framework was selected as a foundation for best practices as a way to enumerate the controls implemented throughout. Translations from NIST to other control frameworks are widely available, resources are provided at the end of this topic.

The product security architecture is maintained by the Automation Anywhere's Product Management team and forms part of a formal policy model as an integral part of the Automation Anywhere Development Roadmap. The following table lists the Control families and the corresponding features and security impacts. Details on each Control family and how the security architecture is implemented in Automation Anywhere products are in the corresponding topics.

Control Family	Control Code	Enterprise Control Room Feature	Security Impact
Access controls	AC-3, 6, 7, 9, 10, 12	Central policy control	Enforce access restrictions for change control and least privileges on system components: - Fine grained access to bots and Bot Runners is controlled via RBAC, - Bot and Bot Runner domains can be assigned to roles via RBAC - RBAC roles are fully audited
	AC-2, 3, 5, 6	Role-based access control (RBAC)	Enable user access, restricts operational privileges, enforces least privilege principles
	AC-17	Bot repository	Bot versioning system with access restrictions
	AC-3, 7, 9, 10, 11	Bot and Bot Runner encryption	Encryption and obfuscation of sensitive information at bot level through credential vault and integration with key management systems
Configuration (change) management	CM-2, 5, 6, 7, 9	Centralized Bot Runner control	Restrict functionality based on roles, domains, implement deny-all and allow-by exception

Control Family	Control Code	Enterprise Control Room Feature	Security Impact
	CM-10	Centralized licensing	Centralized provisioning, tracking and enforcement of Bot Creator and Bot Runner licensing
	CM-2, 5, 6, 8	Bot operations room	
	CM-8	Inventory control	Maintains centralized inventory control of all bots and runtimes
Bot Creator configuration management	SA-10	Bot Creator management, bot check-in, check-out	Enterprise Control Room applies software life cycle management to bots from development, test, and production. Bot versioning enables change control of automations.
Audit and accountability	AU-1 through 15	Audit trail	Automated event logs captured on three levels: Enterprise Control Room, Bot Runners, and Bot Creators. Non-repudiation is assured through read-only logs, all user identities are bound to actions.
Identification and authentication	IA-1 through 5	Active Directory integration, Bot Runner ID and Attestation	Implements Windows platform security including cryptographic bidirectional authentication, Bot Runner identification and attestation, and password management policies. Credential vault with integration with key management systems, protects the integrity of credentials.
Incident response	IR-4, 6	Incident response	Bot Insight embedded analytics capabilities can monitor events and generate alerts to SIEM systems for response.

Control Family	Control Code	Enterprise Control Room Feature	Security Impact
Controlled maintenance	MA-2	Automated maintenance	Enterprise Control Room versioning system provides an automated mechanism to roll out updates to bots, historical information is maintained.

(1) Resources: ISACA provides guides that map NIST SP800-53 to other security frameworks such as CoBIT (SOX), SANS Top20 (<http://www.counciloncybersecurity.org/critical-controls/tools/>) and ISO27002 (<http://www.bankinfosecurity.in/mapping-nist-controls-to-iso-standards-a-7251>).

Cloud operational responsibilities

Learn about secure deployment models, data element locations, and operational responsibilities.

Securing the Cloud

Automation Anywhere Cloud is deployed to only allow access to Automation Anywhere Cloud Operations personnel and Security Team resources. Network and cloud control plane access is restricted using VPN with multi-factor authentication for AAI operational and security personnel. All AAI users must first authenticate using MFA tokens to retrieve short-term credentials to access cloud resources. User credentials are continuously monitored for compliance. All other operational users, cloud resources, and applications are restricted from access to the Control Room. Regular AAI user access certification is conducted to ensure only necessary access is provided to cloud operations personnel.

The cloud service is multi-tenanted and each customer control room environment uses a unique tenant identifier to ensure data separation between the Control Rooms. Automation Anywhere members cannot access a customer environment unless specific permission is provided by the customer, typically under support troubleshooting procedures and controls.

Pure Cloud

With the Automation Anywhere Pure Cloud offering, all business, personal, and operational data is stored on Automation Anywhere administered cloud. Automation Anywhere is the cloud data controller and is responsible for customer data privacy as published in accordance with Automation Anywhere cloud security and compliance with data privacy.

[Cloud Security and Compliance with Data Privacy](#)

Cloud-enabled

With the Automation Anywhere Enterprise Cloud-enabled solution, business, personal, and operational data is stored and managed on the customer-controlled infrastructure, while specific operational data related to RPA is shared between the Automation Anywhere cloud and the customer infrastructure. All data privacy and compliance rests with the customer.

On-Premises with updates through Cloud

With Automation Anywhere On-Premises with updates through Cloud service, all business, personal, and operational data is kept on and deployed from the server on-premises on the customer network. All data privacy and compliance rests with the customer.

The following table lists the securing data and operations responsibilities:

Data requirement	Pure Cloud	Cloud-enabled	On-Premises with updates through Cloud
Infrastructure and data security	Automation Anywhere Enterprise Cloud	Shared customer and Automation Anywhere Enterprise Cloud	Customer
Continuity and disaster recovery	Automation Anywhere Enterprise Cloud	Shared customer and Automation Anywhere Enterprise Cloud	Customer
High availability	Automation Anywhere Enterprise Cloud	Shared customer and Automation Anywhere Enterprise Cloud	Customer
Data localization	Automation Anywhere Enterprise Cloud	Customer	Customer
Data privacy	Automation Anywhere Enterprise Cloud	Customer	Customer
Software upgrades	Automation Anywhere Enterprise Cloud	Shared customer and Automation Anywhere Enterprise Cloud	Customer

The following table lists data types and storage locations:

Data type	Pure Cloud	Cloud-enabled	On-Premises with updates through Cloud
Customer business data - Customer personal data - Business data used in automation	Cloud	Customer network	Customer network

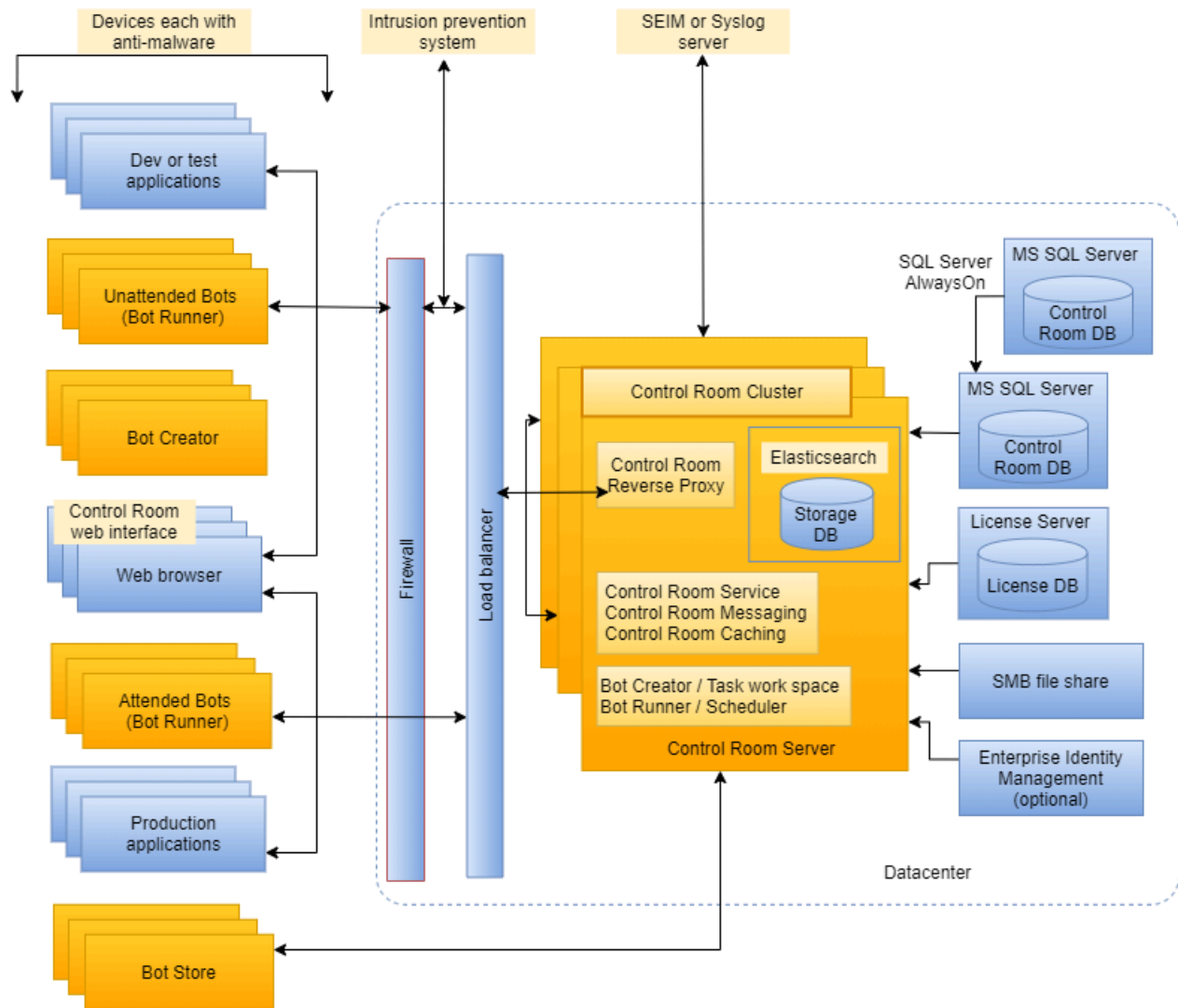
Data type	Pure Cloud	Cloud-enabled	On-Premises with updates through Cloud
Operational data • Operations users, roles, passwords • Device information • Device credentials • Bot schedule • Bot definition • Audit and application logs • WLM definitions and schedules	Cloud	Customer network	Management shared: - Cloud Action package updates - Customer All other data management
Personal data • Username and password • Security key • User device information and credentials • Bot Runner device access • Bot device IP/FQDN • Bot application credentials • User application logs	Cloud	Customer network	Customer network

Securing the RPA environment with external controls

The Automation Anywhere architecture consists of a standard desktop and server class infrastructure for the registered devices and the Enterprise Control Room.

RPA platform

This topic details the best practices for securing the RPA platform with external security controls. Network-based firewalls, Intrusion Detection Systems, anti-malware, and external log servers are all standard security controls that are relevant to RPA deployment and the other infrastructure in your environment. The following figure shows logically where these components are deployed in the RPA deployment:



Each external security control is discussed in detail in the following sections, in terms of placement and configuration. Supporting network services such as Active Directory, SMB File Share, Microsoft SQL Server, and production applications, and are accessed through network firewalls or directly, depending on their placement relative to the RPA components.

Network-based access control to protect RPA with firewalls

Network-based firewalls and local server-based firewall are used to protect the Enterprise Control Room or all nodes in a Enterprise Control Room cluster. By default, required protocols on the Enterprise Control Room are permitted from the corporate network. Additionally, all clustering protocols are permitted only between the nodes in the Enterprise Control Room cluster. Network-based firewalls are used to isolate Development, Test, and Production RPA environments from the corporate network and from each other.

For unattended automation environments, the Bot Runners are placed in a specific isolated network and protected by a network-based firewall. Attended automations run from corporate workstations with the Bot Runner Bot agent installed and are protected via the corporate perimeter firewalls or internal firewalls protecting the corporate desktop infrastructure, like any desktop.

Anti-malware to protect RPA from viruses and malware

The Automation Anywhere Bot agent runs on desktop class infrastructure and is considered a corporate desktop. Anti-malware or anti-virus software is used to protect the registered device environment from malicious software in the form of viruses and malware.

Intrusion detection systems to protect RPA from direct attacks

Intrusion Detection and Prevention Systems (IPS) protect the corporate network by detecting network-based attack through network traffic analysis. Like any other critical section of the data center, an IPS protects the RPA platform at the egress point, behind the network-based firewall.

Independent categories for Bot Creators and Bot Runners

For logical separation of duties, Enterprise Control Room divides automation users into two broad categories: Bot Creators (development) users and Bot Runners (run-time) users.

Bot Creators exist on a separate Microsoft Windows system with its own credentialing system to create, update, and unit test the bots on the Bot Creator. Bot Creators only upload and download bots to and from the Enterprise Control Room. Users on the Enterprise Control Room users have privileges to execute bots on Bot Runners but have no access to the Bot Creators. This separation of duty constitutes a dual authorization by requiring both the developer and the business user to create and execute the bot in conformance with NIST AC-3 best practices.

Role-Based Access Control

Enterprise Control Room implements Least Privileges and Separation of Duties through a configurable Role-Based Access Control (RBAC) capability that conforms to requirements in NIST AC 2, 3, 5, and 6.

All Enterprise Control Room users are assigned one or more roles. Access are available based on the usage conditions assigned to each role when users are a member. Authorized users can temporarily or permanently suspend other users when needed. RBAC enforces session handling to prevent unauthorized access. If an unauthorized user attempts to view session details or gain access, the Control Room cluster will prevent this progress and immediately terminates the unauthorized session. The unauthorized user will be prompted to log in with valid credentials. Inactive accounts can be disabled.

The administrator controls are responsible for all security functions, consistent with best practices in NIST SC-3: Security Function Isolation.

The Enterprise Control Room includes segmented administrator roles by default. Many permissions are supported for creating new roles.

Controls are implemented at the Enterprise Control Room, Bot Creators, and Bot Runners layers, for NIST Access Controls (AC) and Change Management (CM) guidelines. The following technical controls are implemented to ensure access is governed through NIST Least Privileges.

RBAC on bots

Access is deny all and allow by exception based on roles, except for admin roles. Addressing NIST AC-17 (access control), NIST configuration managements for NIST CM-2 (base line configurations), access restrictions for NIST CM-5, NIST CM-6, and NIST CM-7 (least functionality), and monitoring NIST CM-9 for bot activity across the development, test, and production environment.

RBAC on Bot Runners

RBAC on Bot Runners facilitates complete isolation of one department Bot Runner seamlessly from the remaining departments' Bot Runners.

Bots are executed from the Control Room cluster. Local bot executions are protected through multiple layered security, and are designed to prevent fraud as a result from escalation of privileges on Microsoft Windows. The Bot Runner are executed by Windows, addressing access control enforcement in accordance with NIST AC-3 Access Enforcement and AC-6 Least Privilege for Code Execution.

If user roles does not have access to sets of Bot Runners, as a result, these users are unable to view the Bot Runners' executions or remote scheduling automation. See ([Role-based processing domains](#) on page 262).

RBAC for Credential Vault credentials management

Credentials created in the Enterprise Control Room are used across Bot Creators and Bot Runners.

These credentials are securely stored in the centralized Credential Vault to facilitate access control, and to divide in logical groups called lockers. These lockers enable complete separation between the credentials of one department from another.

Role-based permissions

Permissions for credential management-related roles include the following:

Manage my credentials and lockers	By default, all users can manage their own credentials and interact with the lockers to which they have permissions.
Manage my lockers	Allows the user to create and manage their own lockers.
Administer ALL lockers	User can do all the actions in the Admin row of the Locker permissions table below.
Create standard attributes for a credential	User can set an attribute value that remains the same for other users of that credential attribute.

Locker permissions

Locker permissions are set when a locker is created or edited. A user can have the following permissions in a locker:

	View locker	Edit locker	Delete locker	Add participant owner	Remove participant owner	View credential	Assign credential	Remove credential	User-provided value	Standard value
Consume						#			#	
Participate						#	#			
Manage	#	#	#			#	#	#		#
Own	#	#	#	#	#	#	#	#		#
Admin	#	#	#	#	#	#	#	#		#

Related tasks

[Create credential](#) on page 1101

Create a credential and add the required attributes.

[Create locker](#) on page 1102

Create a locker to group similar credentials to share with other users.

Related reference

[Credentials and lockers in the Credential Vault](#) on page 1099

The Credential Vault securely stores sensitive information such as passwords, account numbers, and social security numbers in credentials and lockers for use in automation tasks. It facilitates role-based access for users of an Enterprise Control Room and ensures that sensitive values are not stored in bots or on devices.

Role-based processing domains

The Enterprise Control Room RBAC applies the least privilege principles to domains by implementing Processing Domains, specifying role-based privileges and permissions at the bots and Bot Runners level.

RBAC is applied at a folder level to completely and seamlessly isolate one department bot from the remaining department bots. If the user role does not have access to a set of bots, those bots do not exist, thereby enabling the separation of duties across different domains. For example, finance and accounting roles can access only the bots that automate their respective functions, and specific Bot Runners can execute these bots. This is consistent to best practices as defined by NIST AC-4 Processing Domains.

This permission is further divided into the following sub permissions:

Run

Only those users who have this permission can run bots from the Enterprise Control Room to remote Bot Runners.

Authorized users assign various permutation and combinations of these accesses to different sets of users and roles based on the business need.

RBAC on Audit Log

Audit is automated for all privileged and nonprivileged roles to conform to best practices, as defined in NIST AC-6.

Access is view-only based on a deny all and allow by exception based on roles and domains as defined in the Audit section 7 addressing Audit and Accountability (NIST AU 1 through 15) and as required by NIST AC-2 Automated System Account Management. If a role does not have permission to view Audit Logs, then the Audit Trail tab is not visible to all members of that role. Audit automatically captures all events related to creation, modification, enablement, disablement, and removal of users, bots, Bot Creators, and Bot Runners.

RBAC on viewing bot activity

The Enterprise Control Room Activity menu provides options shows the status of the Automation Anywhere Enterprise automations. These options are: In Progress, Scheduled, and Historical.

Access to bot Activity status is deny all and allow by exception based on roles and domains as defined in RBAC. Two levels of checks are applied to access the bot Activity data. The user is required to be a member of a role that has access to view the Enterprise Control Room. Users with Enterprise Control Room access that can view only the bots belonging to their departments, as applied through RBAC on bots.

RBAC on User Management

Access is deny all and allow by exception based on roles, domains as defined in RBAC. Only those users with access to User Management can manage other users in system.

This permission is further divided into the following sub permissions:

Create Users	Only those users that create new users from the Enterprise Control Room.
Edit Users	Only those users that edit existing users from the Enterprise Control Room.
Delete Users	Only those users that delete existing users from the Enterprise Control Room.

Authorized users assign various combinations of these access permissions to different sets of users and roles based on the business requirements.

RBAC on roles and permissions management

Access is deny all and allow by exception based on roles, domains as defined in RBAC.

Users with access to roles and permissions management can create, edit, and delete roles in the system. This permission is typically assigned to administrators and power users from across enterprises.

RBAC on bot schedules

Access is deny all and allow by exception based on roles and domains as defined in RBAC.

This permission is further divided into the following sub permissions:

Schedule my bots to run	Only those users that create new schedules.
Edit my scheduled activity	Only those users that edit their schedules.
Delete my scheduled activity	Only those users that delete their schedules.
View and manage ALL scheduled activity	Only those users that manage (edit or delete) all the existing schedules created by any user.

Administrators assign various permutation and combinations of these accesses to different sets of users and roles based on the business requirements.

RBAC on license management

Access to license management is deny all and allow by exception based on roles and domains as defined in RBAC.

Only those users with access to license management permission are able to update the license from the Enterprise Control Room. A common license exists for all the users across the Automation Anywhere Enterprise, for a specific Enterprise Control Room. The updated license is effective for all the Bot Creators and Bot Runners registered with the corresponding Enterprise Control Room.

Bot execution access by dynamic access token

The Enterprise Control Room implements and enforces a Trusted Path for registration and authentication of Bot Creators and Bot Runners in accordance with NIST SC-11 to protect against any attempt to execute unauthorized bots.

The Enterprise Control Room issues new client access tokens or identifiers through hashing, signed by the Enterprise Control Room and sent to Bot Creators and Bot Runners over HTTPS. Every subsequent communication between Enterprise Control Room and Bot Creator or Bot Runner is serviced by the Enterprise Control Room after validation of the signature of the latest access token sent by the Bot Creator or Bot Runner. Each access token is unique to every Bot Creator or Bot Runner. This ensures that even if an unauthorized user could bypass enterprise security and access the system, the Enterprise Control Room security restricts any damage.

Secure credential store Credential Vault

The Automation Anywhere platform provides a centralized Credential Vault to securely store all credentials and provision them to bots on an on-demand basis.

Use the Credential Vault to store other information deemed confidential or sensitive. The credential store implements NIST controls IA-2 to uniquely identify and authenticate organizational users (or processes acting on behalf of organizational users).

Sensitive information does not need to be stored in bots or on Bot Runner systems, the Credential Vault facilitates a logical separation of credentials from the bots.

Credential Vault variables are created from the Enterprise Control Room and are instantly available to all the Bot Creators and Bot Runners registered with the respective Enterprise Control Room. Credential Vault adds flexibility and dynamic character to bots because only the credential references are present in the bots, and not the credentials. When bots are moved from one environment to another environment, absolutely no change is required in the bots. Bots can seamlessly pick up the credentials values applicable for the new environment from the Enterprise Control Room of that environment. Additionally, the Enterprise Control Room automatically stores configuration-related sensitive data into the Credential Vault by default.

Credential Vault encryption

The Automation Anywhere Enterprise Control Room installation generates the Master key and Data encryption key.

The Automation Anywhere Enterprise Control Room installation generates the following two keys:

Master key

This RSA-2048 bit key is managed by an administrator outside of the system. This key unlocks the Credential Vault. The administrator types the Master key each time the Enterprise Control Room is started. When the vault is open, the master key is immediately erased from memory and it is not stored anywhere in the Automation Anywhere Enterprise product.

Data encryption key

This AES-256 bit key is stored in the Enterprise Control Room database and is used to encrypt and decrypt the credentials at the time of storage or provisioning. This key is encrypted using the Master key. The Data encryption key does not leave the

Credential Vault at any time. Credential encryption and decryption are done at the Credential Vault.

Credential storage

All sensitive data is stored in the Credential Vault using AES-256 encryption.

These credentials are encrypted by the Credential Vault service to conform to NIST SC-28 and to prevent unauthorized access or disclosure of credentials. Only encrypted credentials travel from the Enterprise Control Room to the Database server and are stored in the database in an encrypted form. The data encryption key encrypts all credentials using an AES 256-bit key generated by a FIPS 140-2 Level 1 validated module to meet the NIST IA-7, SC-12, and 13 requirements for implementation of mechanisms for authentication to a cryptographic module that meets the requirements of applicable federal laws.

The data for [Active Directory](#) user credentials for autologin to Bot Runners is also encrypted and securely stored in the Credential Vault with the bot credentials.

Credential provisioning to bots

Credentials are provisioned only during the execution of automation.

Bot Runners or bots do not store credentials locally. Credentials are provisioned only during the execution of the automation. When the credentials are requested by Bot Runners, encoded (64 bit) credentials travel from the Enterprise Control Room to Bot Runner over HTTPS protocol. When the bots finish execution, credentials are erased from the memory.

Cryptographic providers

Use only the listed supported cryptographic providers.

Enterprise Control Room

AES256	Bouncy Castle FIPS 1.0.2
RSA2048	Bouncy Castle FIPS 1.0.2
HMACSHA256	Bouncy Castle FIPS 1.0.2
PBKDF2 + HMACSHA512	Bouncy Castle FIPS 1.0.2

Authentication with Enterprise Control Room

When a Bot Creator or Bot Runner tries to connect to Enterprise Control Room, the credentials are encrypted using AES (256 bits key length) and RSA (2048 bits key length) and then transmitted on top of the existing layer of Transport Layer Security (TLS).

This extra layer of message level encryption provides protection against network stack issues (such as Heartbleed where OpenSSL was leaking sensitive data from memory) and also adds protection to the last hop of the connection when TLS is terminated at the load balancer. These credentials are decrypted by Enterprise Control Room and authenticated against the hashed (PBKDF2 and HMAC SHA512 algorithm) user passwords or against [Active Directory](#) via Lightweight Directory Access Protocol (LDAP).

Supported authentication methods for Enterprise A2019 On-Premises

Review the authentication methods supported by Enterprise A2019 On-Premises.

Supported authentication methods

- [Active Directory](#) using LDAP
- Active Directory using Kerberos
- SAML
- Local authentication using a database

The benefits of integrating with Active Directory include the following:

Easier adoption	Integrates with an existing authentication solution, compliant with the standards.
Maintenance	All passwords and password policies are centrally administered.
Better user experience	Fewer passwords to remember.

Kerberos provides additional benefits over NTLM pass-through authentication.

- Open standard versus closed proprietary standard
- Mutual authentication of client and server
- Integration with smart cards for 2FA

Local authentication manages user passwords through the Credential Vault. Passwords are hashed using the HMACSHA512 algorithm, which is keyed by the output of the Password-Based Key Derivation Function (PBKDF2). User passwords are encrypted in transit through TLS 1.2.

All authentication and session management is handled through the well-tested Spring Security framework. Kerberos integration is provided through the well-tested Waffle framework. SAML integration is provided through the well-tested OneLogin framework.

Active Directory integration for authentication

Automation Anywhere offers seamless integration with Microsoft Windows Active Directory for access to the Enterprise Control Room, Bot Creators, and Bot Runners. When Enterprise Control Room is integrated with the Active Directory, all the Active Directory users with basic details are directly available in the Enterprise Control Room without any extra configuration. For Active Directory integration, user passwords stay in only Active Directory and are not saved in the platform.

In addition to Active Directory authentication, the Enterprise Control Room has its own controls to prevent unauthorized access to an [Dynamic access token authentication of Bot Runners](#) on page 270y automation data.

[Dynamic access token authentication of Bot Runners](#) on page 270

Bot Runner users can also configure their [Active Directory](#) credentials for Bot Runners machine autologin. These credentials are saved in the centralized Credential Vault.

Multi-domain Active Directory support

Automation Anywhere platform architecture supports single-forest multi-domain Active Directory integration. Enterprise A2019 On-Premises can be configured with Active Directory global catalog server in a way that the Enterprise Control Room, Bot Creators and Bot Runners can all be in the same or different Active Directory domains of a single forest. This gives added flexibility and control for large-scale complex deployment where users are spread across geographies.

Multi-domain support is provided out of the box and no additional configuration is required. The Enterprise A2019 On-Premises user provisioning from different Active Directory domains is also seamless. It enables the Enterprise A2019 On-Premises admin to centrally orchestrate the digital workforce running across the globe.

Support for secure protocols

The Automation Anywhere platform supports secure protocols, for example, TLS 1.2 and HTTPS data transfer.

- Deployment of bots from the Enterprise Control Room to remote Bot Runners is done over TCP and TLS 1.2.
- Upload and download of bots from the Bot Creator to the Enterprise Control Room is done over HTTPS.
- Transfer of any information from the Enterprise Control Room to the database and vice versa is done over TDS and TLS 1.2.
- Transfer of encoded credentials from the Enterprise Control Room to Bot Runners is done over HTTPS.
- WebSocket communication with the real-time data service in the Enterprise Control Room is done over HTTPS.

Network security overview

All communication between the Enterprise Control Room, Bot Creators and Bot Runners is done using outbound WCF TLS 1.2 communications and inbound HTTPS TLS 1.2.

Bot deployment to remote bot runners, provisioning of credentials, automation scheduling, and event capture are done exclusively through the Enterprise Control Room. Use only HTTPS in the production environment.

- The REST APIs use Distributed Cache Service to get shared cached data required for specific functionality.
- The Scheduler Service makes REST API calls to run a task on a specific client machine at a specific time.
- Real-time Data Service makes REST API calls to authenticate incoming connection requests. It receives task execution progress updates by Bot Runners and sends that information to all connected browser clients using WebSocket Secure (WSS) protocol.
- The Enterprise Control Room makes REST calls for user authentication and repository operations, for example, upload a task, download a task, or compare two tasks.
- The Enterprise Control Room makes REST calls to the validate user session at regular intervals. The Enterprise Control Room deploys and runs a task on a specific device using Bot agent. It uses a TCP/IP channel.
- The Scheduler Service makes REST calls for autologin credentials. It also communicates to the Enterprise Control Room to get a license and user session-related information.

- The Enterprise Control Room makes REST calls to get autologin credentials for a logged-in device. It also communicates to the Enterprise Control Room to get the license and user session-related information.

Change management

Access restrictions for configuration management.

Baseline inventory controls for Bot Creators, Bot Runners and bots

The Enterprise Control Room provides a single-pane-of-glass on all automation operations and infrastructure, providing a way to baseline the configuration of the environment. Inventory controls are maintained through the application of RBAC and the use of the Bot Repository, Operations Room, and License Management to establish a single point of control for Base Line Configurations (NIST CM 2) access restrictions for configuration management (NIST CM 5 and 6). Configure automated baseline reporting using the auditing and reporting systems in the Enterprise Control Room.

Change control and documentation RBAC

The Enterprise Control Room RBAC provides a point of access control and management for all changes to the Enterprise Control Room, Credential Vault, Bot Creators, bots, and Bot Runners with an automated mechanism to prohibit changes and report on any attempts to make unauthorized changes. The logging and auditing system on the Enterprise Control Room provides the reporting mechanism for change management to conform to best practices as described in NIST CM-3 through 5.

Software usage and license management

The Enterprise Control Room provides an automated mechanism for tracking and controlling the use of licensed software across Bot Creators and Bot Runners, addressing NIST Change Management CM 10.

Dual authorization change management

Separation of duties is implemented at multiple levels. Dual authorization is achieved through separation of control planes for the Bot Creators and Bot Runners. Only bots created by an authorized Bot Creator can be executed by a separately authorized Bot Runner and only by a user who has been given the privileges to do so by an administrator.

Identity and authentication

All automation actions, for example, create, view, update, deploy, and delete, across the Automation Anywhere Enterprise are done only after Enterprise Control Room authentication is successfully completed.

After authentication is successful, the platform applies a second mandatory level of access control enforcement in the form of fine-grained Role-Based Access Control (RBAC).

The Enterprise Control Room has its own controls to prevent unauthorized access to any automation data.

[Dynamic access token authentication of Bot Runners](#) on page 270.

Password hashing

Password hashing does a one-way, permanent transformation of the passwords of the Enterprise Control Room users, inline with standard password management practices.

Enterprise Control Room passwords are concatenated with a salt and then hashed using the PBKDF2WithHmacSHA512 algorithm before being stored in the database.

- The salt is 256 bits in size and is randomly generated by a cryptographically secure PRNG.
- The HMAC SHA512 algorithm is used for hashing and provides additional security over traditional approaches.
 - A keyed hash provides protection against hash length extension attacks.
 - SHA 512 bit key is larger than the commonly used SHA 256 bit key.
- The key used for the HMAC is from the secure Password-Based Key Derivation Function (PBKDF2).
- Hashing is done for 100,000 rounds (based on NIST recommendations).

Every time a Bot Creator or Bot Runner authenticates against Enterprise Control Room, its credentials are authenticated against the hashed credentials.

Authentication failure messages

If an authentication attempt fails, the Automation Anywhere Enterprise platform does not specifically state if the username or password is incorrect. It only states that the supplied credentials are incorrect.

This is one critical information security requirement for Automation Anywhere Enterprise customers and defends the system against a brute force attack.

This authentication involves the following:

- Bot Creator, Bot Runner connection to Control Room
- User log in to the Control Room from the browser
- Connection from the Control Room to the SQL Server

All failed authentication attempts are logged. See [Audit logs](#) on page 272. Audit Log access is provided as per RBAC and audit logs are made available on a read-only basis for all users.

Authentication for Bot Runners

Two layers of authentication are present for deploying the bots on remote Bot Runners.

The Bot Runner is logged on/connected/unlocked using the configured credentials. These credentials are fetched from the centralized Credential Vault over HTTPS. This first level of authentication is done against the [Active Directory](#) domain automatically, on behalf of the user and is called Bot Runner autologin.

After being authenticated, Bot Runners can be authorized to execute bots independently and asynchronously.

The following table shows what happens to the user session on the Bot Runner after bot deployment.

User session status before bot deployment	During deployment	User session after bot execution finishes
No session exists	Create a new session and deploy the bot	Log off
Unlocked	Deploy the bot	Session remains unlocked

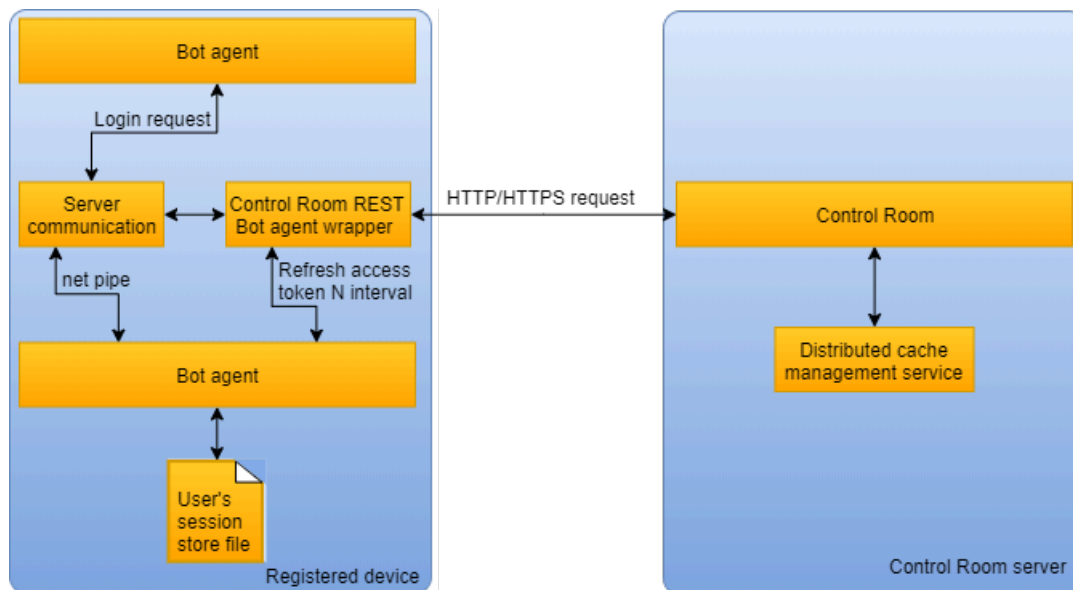
User session status before bot deployment	During deployment	User session after bot execution finishes
Locked	Unlock the session and deploy the bot	Session is relocked
Disconnected	Unlock the session and deploy the bot	Log off

Dynamic access token authentication of Bot Runners

The Enterprise Control Room implements and enforces a Trusted Path for registration and authentication of Bot Creators and Bot Runners in accordance with NIST SC-11.

The Automation Anywhere Enterprise platform protects the automation data against any attempt to subvert the path. The Enterprise Control Room issues new client access tokens, or identifiers, after a predefined time period. These tokens are protected to conform to NIST IA-5 by being signed by the Enterprise Control Room and sent to Bot Creators and Bot Runners over HTTPS. Every subsequent communication between the Enterprise Control Room and Bot Creator/Bot Runner is serviced by the Enterprise Control Room only after validation of the signature of the latest access token sent by the Bot Creator/Runner.

The access token is unique to every Bot Creator/Bot Runner. This protects the system from an unauthorized attempt to bypass security and execute an unauthorized bot, and is consistent with the best practices to conform to NIST IA-9 Service Identification and Authorization. These controls implement IA-3 for cryptographically based bidirectional authentication and attestation of Bot Runners and Bot Creators before establishing connections. This also addresses requirements around unique, automated, identifier management IA-4 for multiple forms of authorization and identification. Identifiers are dynamically managed for audit and control purposes. Identifiers are used as authenticators and managed for verification on initial deployment, revoke, and prevent reuse. There are no static, unencrypted, identifiers in use by Bot Creators or Bot Runners and cached tokens are cleared periodically.



Defenses against common vulnerabilities

The Automation Anywhere Enterprise platform provides some defenses against common attacks on applications.

The list below contains several examples of these attacks and the security controls in place to prevent them.

SQL Injection (SQLi)

SQL injection is a high-risk vulnerability that can seriously impact the confidentiality, integrity, and availability of a database. It enables an attacker to execute any SQL of his or her choosing inside the DB, thus allowing them to read sensitive data, modify/insert data, and execute various operations.

The Enterprise Control Room prevents SQL injection using query provided by the Hibernate framework.

Cross Site Scripting (XSS)

Cross-site scripting is a high-risk vulnerability that can seriously impact the confidentiality, integrity, and availability of any user web session. It enables an attacker to execute any JavaScript inside the victim's browser, allowing them to spy on the user's input/output or take unauthorized actions on behalf of the user. They could also redirect the user offsite to a malicious malware download or a credential phishing page.

The Enterprise Control Room prevents cross-site scripting using automatic output encoding provided by the ReactJS framework.

OWASP Top 10

Automation Anywhere Enterprise provides the following controls to protect against the OWASP Top 10:

Risk	Control
A1: Injection	All input is escaped before commands or queries are executed.
A2: Broken authentication and session management	See the identification and authentication section.
A3: Cross-site scripting	All output is encoded before being returned.
A4: Insecure direct object references	Centralized authorization via Spring Security.
A5: Security misconfiguration	No default passwords, stack traces hidden, secure server configuration
A6: Sensitive data exposure	See the Security at rest and Security in motion sections
A7: Missing function level access control	Centralized authorization via Spring Security
A8: Cross-site request forgery	Using authorization HTTP header
A9: Using components with known vulnerabilities	Black Duck software composition analysis tool
A10: Unvalidated redirects and forwards	N/A - No redirect functionality present

Compliance and vulnerability scanning

Review details about Automation Anywhere compliance and vulnerability scanning.

Secure software development life cycle (S-SDLC)

Automation Anywhere has implemented a development security plan and protocol that defines a specific depth of testing and evaluation to be done by the Engineering team on each release, conforming with best practices as defined by NIST SA-11 Developer Security Testing and Evaluation and NIST SA-15, Development Process, Standards, and Tools. This plan has been documented and shared with the Automation Anywhere Engineering teams.

Veracode vulnerability scanning for static and dynamic code analysis

In each weekly build, during the development process and before every release, all Automation Anywhere software is scanned for flaws using the Veracode tool. Automation Anywhere Enterprise meets the requirements for the strictest security policy available in the tool, Veracode Level 5, which is defined as no Very High, High, or Medium severity vulnerabilities. Analysis reports are available with each release.

Dependency analysis

In each weekly build, during the development process and before every release, all of the third-party libraries and dependencies in Automation Anywhere software are scanned for known vulnerabilities using the Black Duck tool. Automation Anywhere upgrades vulnerable libraries when new versions become available. Analysis reports are available with each release.

All Critical/High vulnerabilities are fixed for each release. Medium vulnerabilities will be considered for fixes in future releases depending on the scope of the Automation Anywhere releases. The list of OSS used by the application is published for each release.

Penetration testing

Automation Anywhere does a penetration test through a third-party vendor before each major release. Additionally, Automation Anywhere incorporates the feedback from penetration tests conducted by customers, which includes some of the largest financial institutions in the world. Analysis reports are available with each release.

Audit logs

The Automation Anywhere Enterprise platform provides a comprehensive and centralized audit logging of all automation activities to authorized users. Role-based access control to Audit Log is managed through the Enterprise Control Room. More than 60 audit actions are logged.

All valid and invalid attempts of actions are logged. Events are logged by the following factors:

Doer of the action	For example, a username.
Source of the action	For example, Bot Runner or Enterprise Control Room
Type of event	The description of the event.

When the event occurred	For example, the date and the time of the event.
Where the event occurred	The device.
Outcome of the event	Description and status of the event.

Some key audit actions include the following:

- Log in and log out of the centralized Enterprise Control Room.
- Create, update, and delete Users.
- Activate and deactivate the Enterprise Control Room users.
- Any change of password for any user
- Create, update, and delete roles (helps in tracking changes to security policy, change in user access privileges)
- Create, update, and delete schedules
- Connection to the Credential Vault
- Create, update, and delete credentials
- Deploy the bots from the Enterprise Control Room to the remote Bot Runners.
- Pause, resume, and stop the ongoing automations.
- Any upload and download from Bot Creators and Bot Runners
- Any check-in, check-out of bots from Bot Creators and Bot Runners
- Update email and other settings
- Enable and disable secure recording.
- Change a license.

RBAC on audit log

Audit is automated for all privileged and nonprivileged roles to conform to best practices as defined in NIST AC-6. Access is view-only based on a deny-all and allow by exception based on roles and domains as defined in the Audit Section 7 addressing Audit and Accountability (NIST AU 1 through 15) and as required by NIST AC-2 Automated System Account Management.

If a role does not have permission to view Audit Logs, the Audit Trail tab is not visible to all members of those roles. Audit automatically captures all events related to creation, modification, enable, disable, user removals, bots, Bot Creators, and Bot Runners.

Enterprise Control Room Bot Creator and Bot Runner activity logging

For every Bot Creator and Bot Runner, the Automation Anywhere Enterprise platform does comprehensive activity logging for bots, workflows, and reports.

Some of the key activities logged include the following:

- Task creation, update, deletion (task is a type of bot).
- Task run
- Workflow creation, update, deletion
- Workflow run
- Report creation, update, deletion
- Report run
- Change in bot properties

Audit of Bot Runner operations

Bot Insight captures additional Bot Runner events for review and analysis of audit records for indications of inappropriate or unusual activity. The Bot Insight logs can be exported for further analysis. Automated dashboards and reports are available and can be customized to identify and alert on anomalous activity. These capabilities conform to best practices as defined in NIST AU-6 Audit Review Analysis and Reporting.

Audit log nonrepudiation

The logs are protected against an individual (or process acting on behalf of an individual) falsely denying having done authorized actions through read-only privileges, automated event capture, and binds the identity of the user to the actions, in conformance with best practices as defined in NISGT AU-10 Non-repudiation and AU-11 Association of Identities.

Export audit logs

All Enterprise Control Room and Bot Insight Bot Runner logs are exported to a Security Event Information Management Systems for further analysis to support the organizations incident response efforts in accordance with the NIST AU-6 and IR-5 requirements.

Additional security controls

Automation Anywhere Enterprise Control Room restricts the database connection configuration with the system administrator account.

Restrict installation from database system administrator account

All the database level transactions are done with a nonsystem administrator account. The Enterprise Control Room installer passes the SQL Server 2012 certification test.

Autolock the device

When Automation Anywhere Enterprise bots are deployed from the Enterprise Control Room to remote Bot Runners, they revert the Bot Runner system to its original state. For example, if the Bot Runner machine was logged off and our bot logged into the machine, it logs it off after the automation execution finishes. This ensures that system level security is not compromised.

Using SHgetKnownFolderPath function

Automation Anywhere software uses the SHGetKnownFolderPath function and Knownfolder_ID to determine the full path to the special folders. This is a recommended practice from Microsoft and use of this function ensures that system will never redirect automation data to any other folder, even if someone attempts to hack the function call. This is also one of the InfoSec requirements of Automation Anywhere Enterprise customers.

API level security

Automation Anywhere software does authentication and authorization level checks at the API level. API calls are serviced only for those users who have permission on the automation data. Unauthorized users cannot bypass system security through rogue API calls.

Clean uninstall

When Automation Anywhere Enterprise client software is uninstalled, it leaves no trailing files or folders behind. This clean uninstall of the Enterprise client software complies with InfoSec policies.

Store data in Program Data folder

Automation Anywhere Enterprise client software allows storing of automation data in the Program Data folder, for the files which must be edited by end users. Permissions are also set on the directory during the installation so that the user can edit the content of the folder. This complies with the InfoSec requirements of Automation Anywhere Enterprise customers.

Protected handling of MSVC DLL files

Automation Anywhere Enterprise client software uses MSVCxxx.dll files for automation purposes, but it does not install these files by itself. Client software directly uses the DLL files installed by only the Microsoft operating system. This ensures that client software does not overwrite the DLL files installed by Microsoft and our customers do not have to worry about doing one more cycle of checking for any introduced vulnerabilities.

Assembly manifest

All the executables (.exe file) of the Automation Anywhere Enterprise Control Room and Enterprise client software contain the manifest files which describe assembly metadata, for example, filename, version number, and culture. This makes our platform comply with organizational InfoSec policies.

Application path on network

Automation Anywhere Enterprise supports configuration of reading and writing automation data to a location on a network drive. This enables users to keep all automation data at one place.

Autologin without disabling legal disclaimer

When Automation Anywhere Enterprise bots are deployed from the Enterprise Control Room to remote Bot Runners, our customers do not need to change security settings, for example, disable login page, disable legal disclaimer, or disable screensaver. Automation deployment works seamlessly without disabling these settings.

Secure Java automation

The Automation Anywhere Enterprise platform can securely automate even those difficult-to-automate business applications which download the Java runtime environment (jre) during automation execution. Whenever these applications are started, an Automation Anywhere Enterprise agent gets associated with Java executable noninvasive and automates the business application. After the automation finishes, the Automation Anywhere Enterprise agent is automatically terminated.

Automation in nonEnglish languages

Users can securely use German, French, Italian, and Spanish language keyboard characters through the embedded automation commands in Bot Creators. This enables users to write data into these languages. Automation Anywhere customers do not need to depend on less secure third-party libraries for this automation.

Automation Anywhere Mobile app

The Automation Anywhere Mobile application (app) enables you to monitor and manage your digital workforce through your mobile devices. The app provides real-time data visualizations in operational and business dashboards and bot status information (completions, in-progress, and failures). You can also upload documents for IQ Bot processing, and start and stop bots.

Use the Automation Anywhere Mobile app to monitor and manage bots. The app provides the following features:

Activity	In progress Start, pause, or stop individual bots. Successful/Failed View the status of each bot with details of the start date and time, run time, and device name.
Insights	Best Workers Choose key bots for monitoring by clicking the star icon on the left of these bots. Business dashboards View data and charts of the business aspects of a bot. Bot Insight Business dashboard Example: Build a bot that creates a dashboard Operational dashboards View data and charts of bots that are deployed on performance on different Bot Runner machines. Bot Insight Operation dashboard
IQ Bot	Upload documents to the Enterprise Control Room using a mobile device. Capture an image of an invoice, purchase order, utility bill, bank statement, auto insurance claim, or health insurance claim.

Mobile application FAQs

Use this topic for answers to common questions about the Automation Anywhere Mobile application.

What mobile platforms and versions are supported?	Apple iOS 10.0 or later Android 8.1 or later
How much space does the mobile app take?	The application is about 30 MB.
What version of Automation Anywhere Enterprise Control Room is required?	The mobile app is compatible with Enterprise A2019.13 and higher versions.
How do I enable the Return on Investment mobile dashboard?	Enable Bot Insight and customize the Center of Excellence dashboard.
Is the communication between the Automation Anywhere Enterprise Control Room and the Mobile app secure?	Yes, the communication between Automation Anywhere Enterprise Control Room and the Mobile application is TLS-encrypted.

Connecting manually to an Enterprise Control Room

Connect to a Enterprise Control Room from the Automation Anywhere Mobile application with a self-signed certificate.

The Automation Anywhere Enterprise Control Room URL might not be published externally (publicly). Mobile application users must either connect to the same Wi-Fi as their organization, or use a VPN to ensure IP accessibility.



Note: Ensure that you enter the entire URL and port for the Enterprise Control Room, for example, `http://10.20.30.123:8080`.

Follow these steps to manually install a self-signed certificate on the mobile device:

1. Download and install the *.cer file.
Find the file through Safari for iOS and Chrome for Android.
2. When prompted, opt to manually Trust the installed certificate profile.

For [iOS](#)

For [Android](#)

General Data Protection Regulation guidelines

The General Data Protection Regulation (GDPR) is one of the strictest compliance frameworks for maintaining privacy of personal data. The GDPR defines personal data as any data that can be used to identify a natural person (Data Subject).

For the most current description of Automation Anywhere GDPR compliance statement, see [Master License Agreement](#) and [Cloud Security and Compliance with Data Privacy](#).

Install and update Enterprise A2019

This collection of topics guides you through the process of setting up Automation Anywhere Enterprise.



Legal disclaimer: The information provided in this workflow might vary depending on which offering is being used. Administrator steps might not be applicable to Enterprise A2019 or Community Edition.

1. System prerequisites: [Enterprise A2019 Cloud prerequisites](#) on page 280:
 - a. If you are using Community Edition, [Get started with Community Edition](#) on page 397.
 - b. Verify your device meets [Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281.
 On-Premises administrators, verify your datacenter meets [Enterprise A2019 On-Premises prerequisites](#) on page 286.
2. Administrators set up bot users.
 These tasks only apply to administrators. Bot users, skip this step and proceed to the step 3.
 - a. Receive your administrator credentials.
 Enterprise A2019 (Cloud deployed) administrators: Receive your login credentials, with administrator privileges, and your Enterprise A2019 dedicated URL from Automation Anywhere Enterprise
 Enterprise A2019 (On-Premises) administrators: Receive your licensing information from Automation Anywhere Enterprise and install Enterprise A2019. The installation user is assigned administrator privileges.
 - Windows installation: [Installing Enterprise Control Room On-Premises](#) on page 284
 - Linux installation: [Installing Enterprise Control Room on Linux](#) on page 359
 - b. Log in to a supported device, open a supported web browser, and log in to your Enterprise Control Room using the dedicated URL: [Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281, [Log in to Automation Anywhere Enterprise Control Room](#) on page 398.
 - c. Create your bot users by assigning a role and device license: [Create a user](#) on page 1106, [Create an Active Directory user](#) on page 1107.
 - d. Set up email notifications to Enterprise Control Room users when events affect them, such as changes to passwords or user information, and account activation or deactivation.
3. Receive your bot user login credentials and the Enterprise A2019 Enterprise Control Room dedicated URL.
 Community Edition users, if you do not have an Enterprise A2019 account, register for a free Community Edition account by visiting [Automation Anywhere Community Edition](#).
 Credentials are sent to you from your company's Automation Anywhere Enterprise administrator or from Automation Anywhere Enterprise.
4. Log in to your Enterprise A2019 account.
 Log in to a supported device, open a supported web browser, and log in to your Enterprise Control Room: [Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281, [Log in to Automation Anywhere Enterprise Control Room](#) on page 398.

5. Register your device and install the Bot agent: [Install Bot agent and register device](#) on page 400.



Note: The Bot agent is installed only on devices running the supported Windows operating systems. See [Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281. However, you can still build bots using the [Bot editor for creating bots](#) on page 517.

6. Start creating bots: [Create your first bot](#) on page 418 or [Build a Go be Great bot](#) on page 886.



Update Enterprise A2019: See [Update to latest Enterprise A2019 version](#) on page 420.

Related tasks

[Log in to Automation Anywhere Enterprise Control Room](#) on page 398

To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.

[Get started with Community Edition](#) on page 397

Use these tasks to register for, and start creating and using bots with Automation Anywhere Community Edition A2019.

Related reference

[Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281

Review the machine hardware specifications, operating system versions, and browser types supported by Enterprise A2019 Cloud for creating and running bots on a device. The same requirements are also valid for Enterprise A2019 Community Edition.

[Supported browsers for Enterprise A2019](#) on page 307

The user interface for Enterprise A2019 (On-Premises or Cloud deployed) and for Community Edition is accessible through a browser.

Get started with Enterprise A2019 Cloud

Use these tasks to start creating and using bots with Automation Anywhere Enterprise A2019 Cloud.

1. Complete the prerequisites for Cloud.

[Enterprise A2019 Cloud prerequisites](#) on page 280

Use the checklist to determine whether your device fulfills the requirements for registering with Automation Anywhere Enterprise A2019 Cloud.

2. Receive your Enterprise Control Room URL and login credentials. The URL points to your Automation Anywhere Enterprise instance.

If you are your company's principal administrator and ordered cloud-deployed Enterprise A2019, you receive an email from Automation Anywhere with your URL and credentials.

3. [Log in to Automation Anywhere Enterprise Control Room](#) on page 398.

To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.

4. Install Bot agent, register your device, and set user device credentials.

[Install Bot agent and register device](#) on page 400 | [Set user device credentials](#) on page 415

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

To enable a device for running bots, set the local device credentials.

If you are using an operating system other than Windows, you will not be able to install the Bot agent at this time. See [system requirements](#). However, you can still build bots using the [Bot editor](#).

5. [Create your first bot](#) on page 418.

Follow these steps to create your first bot that prints the message, Go be great!, the Automation Anywhere version of Hello World!

6. [Run your first bot](#) on page 419.

Run a bot from the same device that you used to create the bot.

Video resources

- Introduction to Enterprise A2019
- Installing the Bot agent in Enterprise A2019:
- Building your first bot:
- Running your first bot in the Community Edition:

Enterprise A2019 Cloud prerequisites

Use the checklist to determine whether your device fulfills the requirements for registering with Automation Anywhere Enterprise A2019 Cloud.

- Verify the device software and hardware requirements.
[Enterprise A2019 Cloud Bot Runner device requirements](#) on page 281
- Access the Enterprise Control Room URL from your browser.
[Log in to Automation Anywhere Enterprise Control Room](#) on page 398
- Add the Automation Anywhere Domain Name System (DNS) to the safe recipients or allowed list to ensure secure access to Enterprise A2019 cloud services.
[Adding Automation Anywhere DNS to safe recipients list](#) on page 283
- Add Automation Anywhere to the Windows firewall exception list.
[Ports, protocols, and firewall requirements](#) on page 303
- Add devices to the allowed list within the corporate network for granular security.
[Network access](#) on page 1135
- Add or update the authenticating proxy credentials to connect your device.
[Connect Bot agent to a device with a proxy](#) on page 415 | [Connect Bot agent to a device with a proxy using a script](#) on page 416
- Set up SAML authentication identity provider if you are using single sign-on (SSO).
[Set up SAML authentication](#) on page 388
- Configure your network firewall to add the outbound NAT Gateway IP addresses to the allowed list.
[NAT IP addresses for Git integration](#) on page 1140

Enterprise A2019 Cloud Bot Runner device requirements

Review the machine hardware specifications, operating system versions, and browser types supported by Enterprise A2019 Cloud for creating and running bots on a device. The same requirements are also valid for Enterprise A2019 Community Edition.

- [Hardware requirements for registered devices](#) on page 281
- [Platform compatibility for registered devices](#) on page 282
- [Supported operating systems for registered devices](#) on page 282
- [Supported browsers for registered devices](#) on page 283

Hardware requirements for registered devices

You communicate with the Enterprise Control Room, through a registered local machine (device). Bot Creators and Bot Runners use the registered devices to create and run bots. Part of registering a device with Enterprise A2019 is installing a Bot agent. The Bot agent can be installed on devices that meet the following hardware requirements.

Device	Processor	RAM	Storage (free disk space)	Network
Machine	Intel Core i3 2.6 GHz with 4 multi-cores or higher 64-bit	• 4 GB (Minimum) • 8 GB (Recommended)	32 GB Add 100 through 150 KB per Automation Anywhere script Add 40 through 50 GB per long-term project	• 5Mbps (Minimum) • 20Mbps or higher (Recommended)

Additional RAM requirements for the registered devices

Add additional RAM to account for applications and services running on the registered devices, for example:

- Microsoft Office applications (example: Excel)
- Browsers (example: Google Chrome)
- Enterprise applications (example: CRM, Oracle EBS, and SAP)
- VDI infrastructure applications
- Anti-virus software

Additional disk space on registered devices

- Automation Anywhere Enterprise scripts average approximately 100-150 KB. Additional free disk space is required to develop automation projects because temporary files such as screenshots, server logs, and audit files are created during the execution of the automation scripts.
- Free space required increases with the project size. Recommendation: Have at least 40-50 GB of free disk space for each long-term project.

- Increase storage space configuration after installation, as needed, depending on product usage. For example, depending upon the complexity of your bot, generating log files and logic creation require additional disk space later.

Platform compatibility for registered devices

A device used to connect to the Enterprise Control Room and perform bot tasks must meet the platform requirements.



Note: Platform requirements are different for Enterprise Control Room and Bot agent.

Registered devices	Physical machines that you want to use for creating bots or deploying bots and running any of the supported operating systems.
Terminal servers	Using remote desktop (RDP) running any of the supported operating systems is supported is supported on Enterprise A2019 Version A2019.11 or later. .
Virtual machines	Bot agent is supported on all VMs where the supported Windows OS has been hosted on Version A2019.09 or later. For example, Virtual Desktop Infrastructure (VDI) are supported on Amazon Web Services, Microsoft Azure, Google Cloud Platform, VMware virtual machines, and Oracle Virtual Box.

Supported operating systems for registered devices

A device used to run the Bot agent, connect to the Enterprise Control Room, and perform bot tasks as a Bot Creator and Bot Runner must meet the operating system requirements.



Note:

- Only 64-bit operating system version supported.
- Bot Creator tasks are supported with all the listed operating systems.
- You cannot register a device that is running on a Linux system. The Bot agent cannot be installed on Linux systems. However, you can use a registered device running on a Windows system to access an Enterprise Control Room that is installed on a Linux system.

Windows version	Windows edition	Attended Bot Runner	Unattended Bot Runner	Bot Creator
Windows Server 2019	Datacenter	Supported	Supported ¹	Supported
Windows Server 2016	Datacenter	Supported	Supported ¹	Supported
Windows Server 2012	Standard	Supported	Supported ¹	Supported

Windows version	Windows edition	Attended Bot Runner	Unattended Bot Runner	Bot Creator
Windows 10	Professional and Enterprise	Supported	Supported ¹	Supported
Windows 8 ²	Professional and Enterprise	Supported	Supported	Supported
Windows 7 ²	Professional and Enterprise	Supported	Supported	Supported

(1) Auto-login

- Auto-login is only supported on 64-bit systems.
- If the Auto-login fails, configure the Local Security Policy settings. For example, in Windows, select Security Settings > Local Policies > Security Options. Enable the Interactive logon: Do not require CTRL+ALT+DEL option.

(2) Supported OS

Windows 8 supported on Enterprise A2019 Builds 1598 and 1610 or earlier.

Windows 7 supported on Enterprise A2019.12 or later.

Supported browsers for registered devices

The user interface for Automation Anywhere Enterprise is accessed through a browser. Login to your device, then login to Enterprise Control Room through a browser.

Browser	Browser version
Google Chrome [*]	57 or later
Microsoft Internet Explorer	11
Microsoft Edge based on Chromium	79 or later

(*) Google Chrome extension: To run a bot that contains actions from the Recorder package, you must enable the Google Chrome extension that corresponds with the Recorder package version. See [Google Chrome browser extension requirements](#) on page 308.

Adding Automation Anywhere DNS to safe recipients list

To ensure secure access to Automation Anywhere Enterprise A2019 cloud services, add specific Automation Anywhere Domain Name System (DNS) to the safe recipients or allowed list.

Automation Anywhere cloud service hosting uses dynamic IP addresses and therefore we recommend that you add to the safe recipients list the complete DNS instead of an IP address for the Automation Anywhere cloud services.

Service	DNS	Port
Automation Anywhere	www.automationanywhere.com	TCP 443 (HTTPS)

Service	DNS	Port
Automation Anywhere Cloud Customer Tenant This includes Automation Anywhere Enterprise Control Room and IQ Bot.	crdomainname- X.my.automationanywhere.digital  Note: crdomainname-X refers to your specific tenant name.	TCP 443 (HTTPS)
Automation Anywhere Bot agent download link	s3*.amazonaws.com/ botrunnermanager/*	TCP 443 (HTTPS)
Automation Anywhere community (A-People)	apeople.automationanywhere.com	TCP 443 (HTTPS)
Automation Anywhere documentation	docs.automationanywhere.com	TCP 443 (HTTPS)
Bot Store	botstore.automationanywhere.com	TCP 443 (HTTPS)
Content delivery network (CDN) CDN enables your platform to perform faster as it geographically distributes common static content for cloud tenants.	aai- artifacts.my.automationanywhere.digital	TCP 443 (HTTPS)
Telemetry Telemetry allows performance and usage information to be gathered anonymously with the intent to improve product quality.	- cdn.whatfix.com - cdn.heapanalytics.com - heapanalytics.com	TCP 443 (HTTPS)

Related reference

[Ports, protocols, and firewall requirements](#) on page 303

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

Installing Enterprise Control Room On-Premises

Review the installation core tasks and topics for installing A2019 Enterprise Control Room in a data center on an On-Premises server or a cloud service provider server instance.

The Enterprise Control Room provides centralized management for a digital workforce and an interface for Bot Insight. It is deployed on a server in a data center. Before you begin, download the appropriate installer for your operating system and version from [A-People Downloads page \(Login required\)](#).



Linux users: See [Installing Enterprise Control Room on Linux](#) on page 359.



Note: Linux is not supported for Cloud-enabled On-Premises installations.

Enterprise Control Room installation core tasks

Step 1: Pre-installation

[Enterprise A2019 On-Premises prerequisites](#) on page 286

Determine whether the system has the required hardware and software to install Enterprise Control Room for A2019 On-Premises.

Step 2: Installation

The Enterprise Control Room installer allows you to select installation modes (Express or Custom), and during the installation process, it also installs missing software dependencies.

Use Custom mode to install on a cloud-based platform such as Amazon Web Services.

[Installing Enterprise Control Room using Express mode](#) on page 338

Log in to the servers as an Administrator and install Automation Anywhere Enterprise Control Room in Express Mode using the default settings.

[Installing Enterprise Control Room using Custom mode](#) on page 330

Log in to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Custom Mode to select installation and configuration options, including installing non-default requirements. Select this mode for a data center deployment.

[Installing Enterprise Control Room on Microsoft Windows Server using scripts](#) on page 366

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized script for a full setup or the command line for a hot fix patch. Silent install runs the entire installation process in the background without requiring user

		interaction or displaying messages.
Step 3: Post-installation	Configuring post-installation settings on page 371 Verifying Automation Anywhere services on page 372	Automation Anywhere specific services are installed on the Enterprise Control Room server.
Step 4: Validation	Configure Enterprise Control Room authentication options on page 378	The options for launching the Enterprise Control Room for the first time depend on the installation mode and, for Custom mode installation, the authentication method.

Enterprise A2019 On-Premises prerequisites

Determine whether the system has the required hardware and software to install Enterprise Control Room for A2019 On-Premises.

Hardware requirements

Enterprise Control Room server requirements on page 291	The Enterprise Control Room is deployed on servers in data centers. The minimum Automation Anywhere hardware requirements include: server type, machine type, processor, RAM, disk storage, and network requirements.
Operating system, environment, and platform supported for Enterprise Control Room on page 295	
Bot agent compatibility on page 403	Bot agent is the Automation Anywhere Enterprise plug-in that enables you to create and run bots. The agent is installed on devices used to access the Enterprise Control Room. Installing the Bot agent is part of registering a device.
Credential requirements on page 298	Login credentials are required at different stages of Automation Anywhere deployment and use. Credentials are required for installation and data center servers, access to Automation Anywhere components, and to run tools in bots.
Supported cloud platforms on page 297	Review the supported cloud platforms for various Enterprise A2019 features.

Data center requirements

[Database requirements](#) on page 292

View the list of supported databases, database server type, version, hardware, and operating system requirements, and database backup and recovery requirements.

[Working with SQL Servers](#) on page 294

Configure Microsoft SQL Servers before setting up the Enterprise Control Room database.

[Working with Azure SQL PaaS](#) on page 295

Using PaaS SQL database with Azure requires configuration from the Azure instance.

[Load balancer requirements](#) on page 301

View the load balancer requirements for Automation Anywhere installation. This includes load balancer minimum requirements, and both TCP and HTTPS layer load balancing requirements.

[Ports, protocols, and firewall requirements](#) on page 303

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

[Supported browsers for Enterprise A2019](#) on page 307

The user interface for Enterprise A2019 (On-Premises or Cloud deployed) and for Community Edition is accessible through a browser.

[Automation Anywhere Enterprise deployment models](#) on page 320

Automation Anywhere Enterprise provides multiple deployment options to meet various levels of enterprise cost/price performance and resiliency requirements. This includes installation on single-nodes, highly available (HA) clusters, and disaster recovery (DR) sites.

[High availability deployment](#) on page 322

The high availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases using a distributed load balancer.

[Single-node deployment](#) on page 320

A single-node deployment hosts the Enterprise Control Room only on one server or machine.

See also this article on the Automation Anywhere support site: [Enterprise A2019 On-Premises prerequisites \(A-People login required\)](#).

Related concepts

[Installing Enterprise Control Room on Microsoft Azure](#) on page 346

Installing Enterprise Control Room on Microsoft Azure begins in the Azure environment and ends with configurations in the Enterprise Control Room.

[Installing Enterprise Control Room on Amazon Web Services](#) on page 340

Login to an Amazon Web Services (AWS) server instance as Administrator. Then download and start the Enterprise Control Room installer and select Custom mode.

[Installing Enterprise Control Room using Custom mode](#) on page 330

Log in to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Custom Mode to select installation and configuration options, including installing non-default requirements. Select this mode for a data center deployment.

Related tasks

[Installing Enterprise Control Room using Express mode](#) on page 338

[Installing Enterprise Control Room on Microsoft Windows Server using scripts](#) on page 366

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized script for a full setup or the command line for a hot fix patch. Silent install runs the entire installation process in the background without requiring user interaction or displaying messages.

Capacity and performance planning

To plan your deployment capacity and performance for Enterprise Control Room On-Premises, understand the requirements, limits, and defaults that determine the number of simultaneous bots, user sessions, and processing rates.

The following topics provide information to help you calculate a deployment scenario that meets your requirements.

[Bot deployment and concurrent operations](#) on page 288

To plan your deployment capacity and performance for Enterprise Control Room On-Premises, understand the requirements, limits, and defaults that determine the number of simultaneous bots, user sessions, and processing rates.

[Bot Quality of Service priorities](#) on page 290

Use of the concept Quality of Service (QoS) applies to availability of the Enterprise Control Room.

[Bot agent status processing](#) on page 290

A method called rate limiting is applied to the rate at which status message from a Bot agent is processed.

Bot deployment and concurrent operations

List of maximum concurrent operations and estimated deployment times.

Overview

The entity count in the following list provides information about the maximum number of entities that the Enterprise A2019 can support. Deploying additional Enterprise Control Room or machine resources does not affect the entity count.

Enterprise A2019 supports up to:

- 1000 simultaneous bot deployments and executions on Bot Runner sessions.
- 300 simultaneous bot deployments and executions on Bot Creator sessions.

Entity Type	Count
Users	5000
Roles	2000
Schedules	1500
Audit entries	5,000,000
Lockers	100
Credentials	5000
Repository files	2500
Repository folders	1250
Queues	10
Device pools	10
Work Items	1,000,000

Concurrent deployment operations

The time taken for deployment depends on the network quality. An increase in the number of Enterprise Control Room and the network connectivity speed improves the throughput and enables faster deployment.

Automation Anywhere supports up-to 1000 simultaneous bot deployments and executions across the Enterprise Control Room cluster.

Enterprise Control Room edition and configuration	Number of Run as users	Deployment time
One instance of On-Premises	Maximum 1000	3 minutes
Three instances of On-Premises with High Availability (HA) configuration	Maximum 1000	3 minutes

Bot concurrent schedules

Scheduling considerations when running bots repeatedly.

When configuring bots to run repeatedly on a schedule it is important to make sure that the time between runs does not drop below the total time for deployment and execution of the bot. Otherwise, sequential executions of the bot might overlap leading to unexpected behavior.

For example if it takes 20 seconds to run a bot, do not schedule the bot to run every 15 seconds. The previous run cannot complete before the next run begins.

With the reference specification, it is possible to successfully configure concurrent schedules.

Activity	Schedule data
Concurrent schedules	100
Run as user per schedule	10

Activity	Schedule data
Total concurrent bots	1000
Deployment time	3 minutes

Bot Quality of Service priorities

Use of the concept Quality of Service (QoS) applies to availability of the Enterprise Control Room.

To maintain high operational availability the Enterprise Control Room is designed around the concept of Quality of Service (QoS).

Each incoming request is examined to identify, and requests are prioritized based on:

- Whether the request originated from a device or not
- What high-level Enterprise Control Room function it is for (repository, configuration, etc.)

Request originator type

High priority is assigned to API requests that do not originate from a Bot agent, such as a user accessing the Enterprise Control Room through a web browser. This ensures administrative functions, such as viewing the status of a device or disabling a bot, run even when the Enterprise Control Room is fully utilized.

Repository requests from devices

By default, the number of device requests processed in parallel by the Enterprise Control Room repository are limited. Any requests that are received above the limit are queued first in, first out with very little overhead. This enables control of the CPU and operating system thread consumption for repository operations.

Other bot deployment and execution requests from devices

Bot agent make infrequent requests to other services on the Enterprise Control Room related to the deployment and execution process. The completion time for individual requests of this type are not influenced by network capacity.

Security token refresh from devices

Security token refresh requests from devices are prioritized ahead of other device requests.

Bot agent status processing

A method called rate limiting is applied to the rate at which status message from a Bot agent is processed.

How quickly status updates from a Bot agent is processed is rate limited. The rate limit is based on the Bot agent Enterprise Control Room node. This prevents overload when concurrently executing a large number of bots.

- The rate limit is adjusted dynamically based on the number of unprocessed status update messages.
- Critical status update messages that indicate start, stop or error are never rate-limited.

- If reactive rate-limiting is activated, the progress reported on the Activity page is updated at a lower frequency than normal.

Enterprise Control Room server requirements

The Enterprise Control Room is deployed on servers in data centers. The minimum Automation Anywhere hardware requirements include: server type, machine type, processor, RAM, disk storage, and network requirements.



Note: Automation Anywhere does not provide any monitoring functions for repository such disk space usage, memory or other alert mechanisms related to repository. There are commercial tools available from other third party independent software vendors (ISV) who provide such tools.

The installation wizard requires the following:

- IP addresses - Identify all the nodes (servers) IP addresses in the data center cluster before installation. You provide these IP addresses during Enterprise Control Room installation.
- Access hardware - To enable viewing the Automation Anywhere interface, provide:
 - keyboard
 - mouse or other pointing device
 - monitor with 1366 x 768 or higher resolution



Note: For IQ Bot server requirements, see [IQ Bot hardware and software requirements](#).

Enterprise Control Room must be installed on a 64 bit, server level machine and there can only be one instance of it on the machine. All previous Enterprise Control Room versions must first be removed from the server machine before you begin the installation.

The following server requirements for Windows and Linux.

Component server	Processor	RAM	Storage (free disk space)	Network
Enterprise Control Room Servers	8 core Intel Xeon Processor	16 GB	500 GB	1 GbE IPv4 or IPv6



Tip: We recommend you to configure the Enterprise Control Room network bandwidth to above 1 GbE for all inter-cluster communication between:

- Enterprise Control Room and database
- All Enterprise Control Room nodes
- Enterprise Control Room and Elasticsearch nodes
- Enterprise Control Room and storage systems
- Database nodes for high availability (HA) and disaster recovery (DR) configuration

Database requirements

View the list of supported databases, database server type, version, hardware, and operating system requirements, and database backup and recovery requirements.

Automation Anywhere installation creates a database to store bot data and metadata for the analytics dashboards.



Note: Automation Anywhere does not provide any monitoring functions for database activities, such as disk space usage, memory, or other alert mechanisms related to databases. There are commercial tools available from database vendors and other third-party independent software vendors (ISV) who provide such tools.

For latest updates, see [Microsoft SQL Server Hardware and Software requirements](#).

Database server hardware requirements

Component server	Processor	RAM	Storage	Network
Microsoft SQL Server database	4-core Intel Xeon Processor	8 GB	500 GB	1 GbE

Database server version and operating system requirements

Microsoft SQL Server database is required.

Database type	Database version	Database edition	Installed OS	Supported platforms	Configuration requirement
Microsoft SQL Server database	2019 2017 2016 2014 SP1	Enterprise Express Standard	Windows Server 2008 R2 Standard or later Linux CentOS 7.7 Red Hat Enterprise Linux 7.7	Amazon Web Services Relational Database Service (RDS)	Installed and configured. Only option for Express installations. Enable protocols for Named Pipes and TCP/IP.

- All database versions support all certified operating systems.
- We have certified Amazon RDS for SQL Server and Azure SQL single database for PaaS deployment.

Required database information for Automation Anywhere installation

When you install Automation Anywhere, you are prompted to provide information specific to the database type you are using. The following table summarizes the required information.

Microsoft SQL Server database	
Required information	Description
Database (SQL Server) authentication  Note: Linux installations use this authentication method	Provide credentials for a Microsoft SQL Server user who has permission to connect to the database. Use only supported characters for the authentication user name and password. See Supported special characters on page 313. Do not use semicolons (;) in the database password. Linux example: SQL Database server Login ID: sa SQL Database password: Automation123 sa user authentication is mandatory.
Database names	Database names cannot be blank, have spaces, or include a percent (%). Restrict the names to alphanumeric, period (.), hyphen (-), and underscore (_). Default name: AAE-Database
Database port	Default: 1433 Connection to this port is mandatory.
Secure connection (optional) and certificate	Provide a CA certificate. Ensure the certificate host name and database connection are the same.
Service credentials	Provide Local system account user or Domain user account. This becomes the assigned user for the created databases and tables. The preferred method is to use the Domain user account. Provide the user with system administrator or database creator permission to create databases during installation.
Windows authentication	User-provided (or default) used to connect to the Microsoft SQL Server, test database exists, create database if not present, and set db_owner to the service account user.

Before installing Enterprise A2019, ensure that you have configured additional firewall settings, verified the connection to the default port and an SQL query with SA user works as expected.

Related concepts

[Installing Enterprise Control Room on Amazon Web Services](#) on page 340

Login to an Amazon Web Services (AWS) server instance as Administrator. Then download and start the Enterprise Control Room installer and select Custom mode.

[Installing Enterprise Control Room on Microsoft Azure](#) on page 346

Installing Enterprise Control Room on Microsoft Azure begins in the Azure environment and ends with configurations in the Enterprise Control Room.

Related tasks

[Installing Enterprise Control Room on Linux](#) on page 359

You start installing the Automation Anywhere Enterprise Control Room in the Linux environment and complete the installation in the Enterprise Control Room.

[Configure default database port](#) on page 336

Configure and enable the TCP/IP in the SQL database server to use the default port 1433 when you install the Enterprise Control Room.

Related reference

[Ports, protocols, and firewall requirements](#) on page 303

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

Working with SQL Servers

Configure Microsoft SQL Servers before setting up the Enterprise Control Room database.

Configuring SQL Server Settings

[SQL Server](#) settings can be configured in the SQL Server Configuration Manager.

1. Enable protocols for Named Pipes and TCP/IP in SQL Server Network Configuration > Protocols for MSSQLSERVER.
2. Double-click TCP/IP to open the properties window.
3. Input the port number for `IPAll` in the IP Addresses tab of the TCP/IP Properties window.
4. Click OK.
5. Restart the MSSQLSERVICE for the updates to take effect.

Database and Services Matrix

See [Database requirements](#) on page 292 for a list of supported Microsoft SQL Server versions.

Service Credentials	Windows Authentication	SQL Authentication
Local System Account	• Current logged in user account is used to create: • Database • Tables • Installer gives <code>db_owner</code> permission to NT AUTHORITY\SYSTEM account.	SQL User account is used to create: • Databases • Tables

Service Credentials	Windows Authentication	SQL Authentication
Domain User Account	- Current logged in user account is used to create database. - Domain user account is used to create tables. - Installer gives <code>db_owner</code> permission to domain user account.	SQL User account is used to create: - Databases - Tables
Service User Account		For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.

Related reference

[Ports, protocols, and firewall requirements](#) on page 303

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

Working with Azure SQL PaaS

Using PaaS SQL database with Azure requires configuration from the Azure instance.

Configure the Azure instance before you install Automation Anywhere Enterprise.

1. Log in to your Azure account.
2. Navigate to the Azure SQL option.
3. Create a database based on your custom requirements.
4. Enable the firewall option.
5. Add the IP address to safe recipients list for accessing the database.

Install Automation Anywhere Enterprise and point the database server to this instance of the SQL database. See [Customize Enterprise Control Room installation on Microsoft Azure](#) on page 350.

Operating system, environment, and platform supported for Enterprise Control Room

Enterprise A2019 can be hosted on AWS, Microsoft Azure, Google Cloud Platform, IBM, and any public, private, or hybrid cloud service that meets the Enterprise Control Room and Bot agent hardware and software requirements.

Enterprise A2019 is currently certified on AWS and Microsoft Azure. For Bot agent operating system and platform compatibility, see the Bot agent compatibility matrices in [Bot agent compatibility](#) on page 403.

Enterprise A2019 supports 64-bit version of the Microsoft operating system.



Recommendation: Enable Desktop Experience when using the server or client operating system.

The following sections list the environment and deployment types with the release or build number applicable to each supported operating system:

- [Microsoft Windows Server 2012 and 2012 R2 Datacenter](#) on page 296
- [Microsoft Windows Server 2016 Standard and Datacenter](#) on page 296
- [Microsoft Windows Server 2019 Standard and Datacenter](#) on page 296
- [Linux CentOS 7.7](#) on page 297
- [Red Hat Enterprise Linux 7.7](#) on page 297

Microsoft Windows Server 2012 and 2012 R2 Datacenter

Environment	Deployment type with release and build
Amazon Web Services Elastic Compute Cloud (EC2)	• A2019.12 On-Premises Build 4105 or later • A2019.12 Cloud Build 4111 or later
Microsoft Azure VM	• A2019.12 On-Premises Build 4105 or later • A2019.12 Cloud Build 4111 or later
Google Compute Engine	A2019.17 On-Premises Build 7103 or later
Microsoft Windows Server	• A2019.12 On-Premises Build 4105 or later • A2019.12 Cloud Build 4111 or later

Microsoft Windows Server 2016 Standard and Datacenter

Environment	Deployment type with release and build
Microsoft Azure VM	• On-Premises Build 2079 or later • Cloud Build 2079 or later
Google Compute Engine	A2019.17 On-Premises Build 7103 or later
Microsoft Windows Server	• On-Premises Build 1089 or later • Cloud Build 1082 or later

Microsoft Windows Server 2019 Standard and Datacenter

Environment	Deployment type with release and build
Amazon Web Services Elastic Compute Cloud (EC2)	• On-Premises Build 1089 or later • Cloud Build 1082 or later
Google Compute Engine	A2019.17 On-Premises Build 7103 or later
Microsoft Azure VM	• On-Premises Build 2079 or later • Cloud Build 2079 or later

Environment	Deployment type with release and build
Microsoft Windows Server	- On-Premises Build 1089 or later - Cloud Build 1082 or later

Linux CentOS 7.7

Environment	Deployment type with release and build
Amazon Web Services Elastic Compute Cloud (EC2)	- On-Premises Build 2545 or later - Cloud Build 2545 or later
Microsoft Windows Server	- On-Premises Build 2545 or later - Cloud Build 2545 or later

Red Hat Enterprise Linux 7.7

Environment	Deployment type with release and build
Amazon Web Services Elastic Compute Cloud (EC2)	- On-Premises Build 2545 or later - Cloud Build 2545 or later
Microsoft Windows Server	- On-Premises Build 2545 or later - Cloud Build 2545 or later

Related reference

[Bot agent compatibility](#) on page 403

Bot agent is the Automation Anywhere Enterprise plug-in that enables you to create and run bots. The agent is installed on devices used to access the Enterprise Control Room. Installing the Bot agent is part of registering a device.

[Enterprise Control Room server requirements](#) on page 291

The Enterprise Control Room is deployed on servers in data centers. The minimum Automation Anywhere hardware requirements include: server type, machine type, processor, RAM, disk storage, and network requirements.

Supported cloud platforms

Review the supported cloud platforms for various Enterprise A2019 features.

Table 2: Compatibility matrix

Enterprise A2019 feature	Google Cloud Platform	AWS	Microsoft Azure
Enterprise Control Room	Yes	Yes	Yes

Enterprise A2019 feature	Google Cloud Platform	AWS	Microsoft Azure
Bot agent	Yes	Yes	Yes
Bot Insight	Yes	Yes	Yes
IQ Bot	Yes	Yes	Yes
Discovery Bot	Yes	Yes	Yes
AlSense Recorder	Yes	Yes	Yes

Credential requirements

Login credentials are required at different stages of Automation Anywhere deployment and use. Credentials are required for installation and data center servers, access to Automation Anywhere components, and to run tools in bots.

Access point	Task	Type
Data center servers	Install Enterprise Control Room.	User on the hosting server: - Windows - system administrator - Linux - superuser sudo, root
Data center servers	Manage (run, stop, restart) Enterprise Control Room.	Administrator and Logon as Service permission for Windows services and the Domain or the VM technical user account.
Bot agent devices	Install, setup, or update Bot agent.	Administrator permission on the device.
Bot agent devices	Start or stop Bot agent service.	Administrator permission on the device. Write permission on Bot agent device system paths: C:\ProgramData C:\Windows\System32\config\systemprofile C:\Users\<loggedInUser>\AppData\Local\AutomationAnywhere

Access point	Task	Type
Local devices	Register device.	Windows login to open a browser and login into the Enterprise Control Room and register the local device. Administrator permission not required.
Local devices	Download bots to local device. Run new bots or existing (downloaded) bots.	Windows login. Administrator permission not required.
Automation Anywhere login	Perform specific tasks, such as create a bot or run a bot.	License and role based permissions. Bot Creator and Bot Runner users do not require administrator privileges.
bot task	Used by bots to perform bot tasks.	Credential Vault stores securely created credentials. Read permission on bot machine system path: C:\Windows \System32\config \systemprofile \AppData\Local \AutomationAnywhere
Automation Anywhere Service	Run all Windows services created by Automation Anywhere.	Local system account user or Domain user account.
Remote Desktop Protocol (RDP) to a Windows machine	Run bots on Bot Creators and unattended Bot Runners if RDP connection exists for the deployed user.	Administrator permission is not required. RDP access for the bot is not required. view the Enterprise Control Room Activity page.
Remote Desktop Protocol (RDP) to a server OS or a hosted VM	Run bots on Bot Creators and unattended Bot Runners if RDP connection exists for the deployed user.	Administrator permission required. RDP access for the bot is required. For confirmation, view the Enterprise Control Room Activity page.

Data center server credentials

Data center server credentials for Automation Anywhere hosting servers and integrated product

servers are required to deploy Automation Anywhere.

To install and deploy Automation Anywhere requires that users log in to the hosting servers. These users must have permissions to install and run Automation Anywhere components on the servers. Permissions levels need to be assigned to the user on selected data center applications and servers.

Automation Anywhere login

Login to Automation Anywhere Enterprise requires a username and password. These credentials are linked to the machine you use to access the Automation Anywhere components. Your credentials are assigned roles that give you permission to perform specific tasks, such as create a bot or run a bot.

Bot task

As an automation expert, Credential Vault provisions you to securely create and store your credentials. This ensures that your credentials can be used in bots without compromising security with safe deployment of tasks. Any authorized user can create credentials.

Windows services

The Windows service credentials include a user name and password. The user specified needs to be:

- A member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.

The service credentials are used to create database tables and allow the Enterprise Control Room processes to access the database and repository.

The service credential choices are:

Local System Account	The logged-on user performing the installation (default) .

Domain User Account	A user that is not the local system account user.

Reasons and requirements for using a domain account user include:

- Use the Windows domain credentials

Enter credentials valid for running Automation Anywhere services.

- PowerShell script restrictions

Specify a user with permissions to launch PowerShell scripts, who is not a Windows domain user, or database table creation can fail.

Load balancer requirements

View the load balancer requirements for Automation Anywhere installation. This includes load balancer minimum requirements, and both TCP and HTTPS layer load balancing requirements.

Load balancer minimum requirements

For best practice with Automation Anywhere, ensure the load balancer:

- (Required) Supports WebSocket protocol (RFC 6455)
- (Preferred) Uses round-robin host selection and is not configured to use persistent (sticky) sessions.
- (Preferred) Uses the appropriate TLS security layer:
 - TCP (layer 4) load balancing
 - HTTPS (layer 7) load balancing

With a Nginx load balancer, set HTTPS termination at nodes by changing `http://Backend` to `https://Backend`.

- (Preferred) Has idle timeout set to 120 seconds.

The timeout value depends on the process time of various actions in the Enterprise Control Room such as the time required to check in and check out bots, import bots, and download bot dependencies.

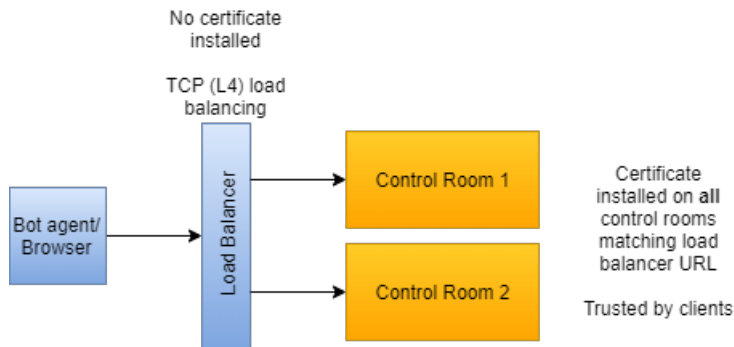
If the idle timeout is less than the Enterprise Control Room processing time, a browser request can time out. For example, if the configured idle timeout is not sufficient to complete a bot check-in action, you will have to refresh your browser to validate whether the bot check-in action is successful or not.

Load balancer health check parameters

The load balancer health check parameters depend on various factors such as the type of load balancer used, network latency, and user interface responsiveness within and outside the load balancer.

TCP (Layer 4) Load Balancing

When TCP is applied at layer 4 with the load balancer, the certificate is installed on every Enterprise Control Room corresponding to the load balancer URL.



Pros

End-to-end encryption without the possibility of intercept at the load balancer.

Single certificate required.

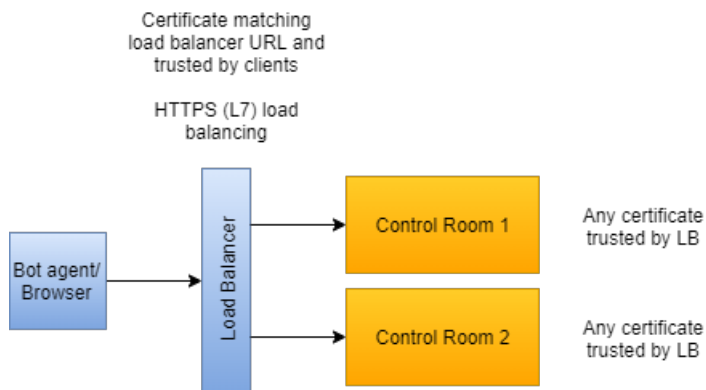
Cons

If audit logging is required, the load balancer cannot report the requests from clients.

Does not use TLS hardware offloading, even if the load balancer supports it.

HTTPS (Layer 7) Load balancing

When HTTPS is applied at layer 7 with the load balancer, the certificate corresponding to the load balancer URL is applied through the load balancer. The Enterprise Control Room trusts the certificates received from the load balancer.



Pros

Allows request logging, when supported by the load balancer.

Reduces load from TLS handshake through hardware offloading, when supported by the load balancer.

Cons

Certificates must be managed both on the load balancer and on the control room nodes

Possible interception of data at the load balancer hardware level, because TLS session is not end-to-end.

Ports, protocols, and firewall requirements

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

Add Automation Anywhere to the Windows Firewall exception list. Follow the steps as directed by Microsoft for your Windows version.

Configure the firewall rules and add the Enterprise Control Room URLs to safe recipients list.

[Adding Automation Anywhere DNS to safe recipients list](#) on page 283

Refer to the following tables for lists of required ports and their use.

Enterprise Control Room

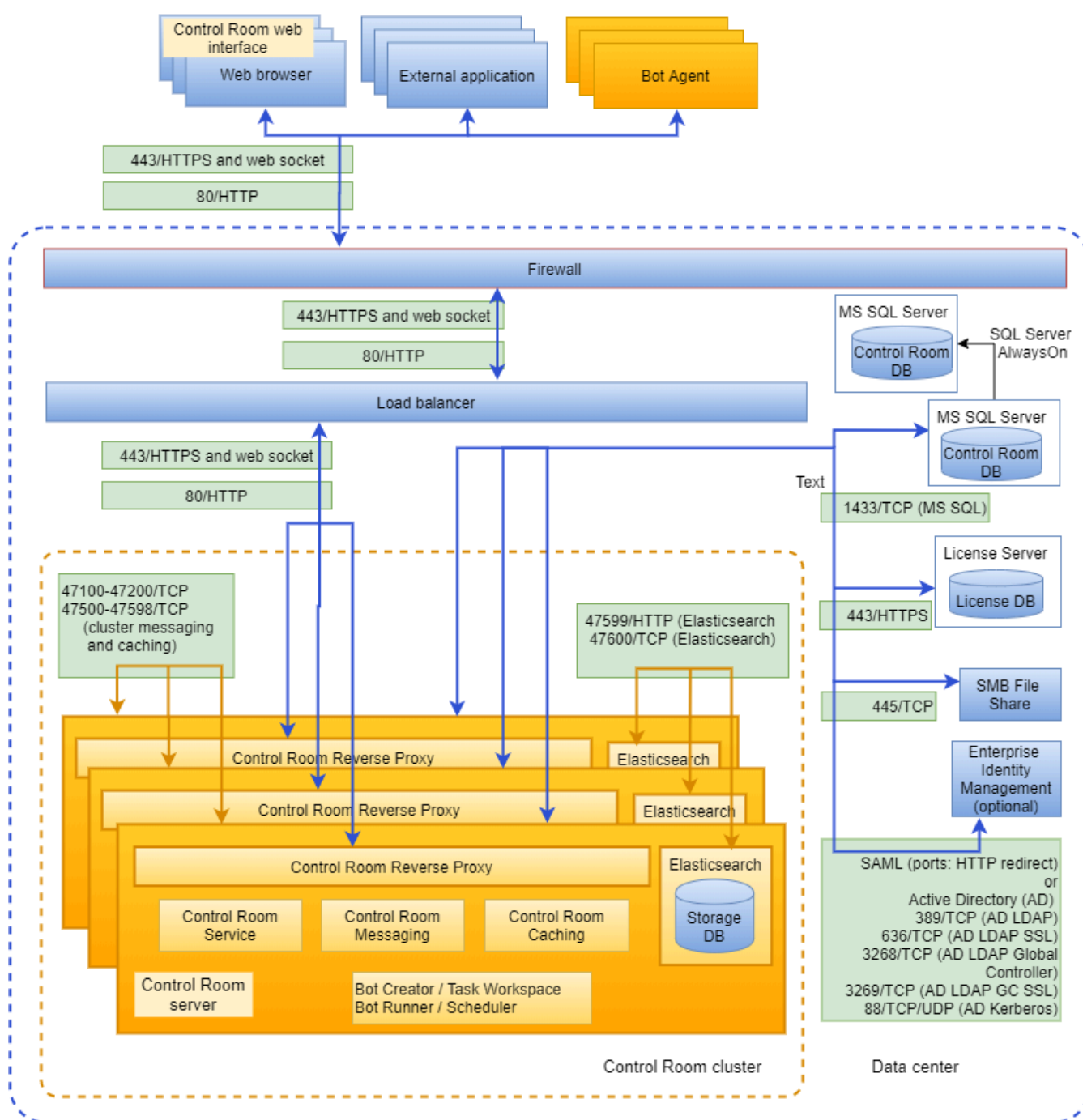


Warning: It is critical that communication between the Enterprise Control Room servers is properly protected. These Enterprise Control Room servers contain security sensitive information that is not encrypted. Therefore, excluding the Enterprise Control Room servers, you should block all other network hosts from accessing the listed Automation Anywhere cluster communication ports.

Protocol	Incoming Port	Usage	Clients
HTTP	80	HTTP	Web browsers
HTTPS	443	HTTPS and Web Socket	Web browsers
TCP	5672	Cluster Messaging	Enterprise Control Room Services
TCP	47500 – 47600	Cluster Messaging and Caching	Enterprise Control Room Services
TCP	47100 – 47200	Cluster Messaging and Caching	Enterprise Control Room Services
HTTP	47599	Elasticsearch	Enterprise Control Room Services
TCP	47600	Elasticsearch	Enterprise Control Room Services

Data center ports and protocols for Automation Anywhere Enterprise

Configure each of the data center components that are required for Enterprise Control Room integration.



Default ports are listed for illustration purposes. Some ports can have alternative port numbers specified during Enterprise Control Room installation. Some port numbers can be modified after Enterprise Control Room installation. Active Directory ports are listed as an example of an enterprise identity management.

All three objects, the web browser, Bot agent, and external applications communicate directly with the Enterprise Control Room. A user logs into the Enterprise Control Room through a browser, to do tasks, such as creating users, or bot related tasks, such as creating, deploying, and scheduling bots. Bot agent establishes a connection with the Enterprise Control Room on registration and keeps it alive in order to receive bot deployments from the Enterprise Control Room. External applications talk to the Enterprise Control Room directly through the Enterprise Control Room APIs to perform tasks such as creating users or running bots.

Data center object	Port default	Protocol default	Notes
Load balancer	443 80	HTTP, HTTPS, and web socket	
Firewall	443 80	HTTP, HTTPS, and web socket	
Enterprise identity management Example: Active Directory ports	389 636 3268 3269 88	- TCP (LDAP) - TCP (LDAP SSL) - TCP (LDAP Global controller) - TCP (LDAP Global controller SSL) - TCP/UDP (Kerberos)	
Microsoft SMB file share	445	TCP	
Microsoft SQL database server	1433	TCP	Override default at Enterprise Control Room installation.

Microsoft Azure supported data center elements

Data center object	Supported version	Configuration
Enterprise Control Room operating system	- Microsoft Windows Server 2012 and 2012 R2 Datacenter - Microsoft Windows Server 2016 Standard and Datacenter - Microsoft Windows Server 2019 Standard and Datacenter	IaaS
Identity management: Azure Active Directory	Azure Active Directory	- IDaaS - Windows 2016 for IaaS
SMB File Share	Azure File Share	PaaS
Load Balancer	Azure Load Balancer (Not Application Gateway)	PaaS
Microsoft SQL Server	Azure SQL Database with single database (Microsoft SQL Azure (RTM) - 12.0.2000.8)	PaaS

Microsoft Azure security policy recommended ports

Data center object	Port	Protocol
Enterprise Control Room	80 443	Any
LDAP	3268 3269	Any
email SMTP	587	Any
SSH	22	Any
RDP	3389	TCP

Google Cloud Platform security policy recommended ports

Data center object	Port	Protocol
Load balancer	80 443	- HTTP - HTTPS
Firewall	80 443 1433	- HTTP - HTTPS - TCP
Microsoft SQL Server database	1433	TCP

Related tasks

[Prepare for installation on Amazon Web Services](#) on page 341

Use these steps to prepare the Amazon Web Services (AWS) instances for the Enterprise Control Room installation.

[Verify readiness for installation on Microsoft Azure](#) on page 347

Use these steps to configure third-party products for the Enterprise Control Room installation.

Related reference

[Enterprise A2019 On-Premises prerequisites](#) on page 286

Determine whether the system has the required hardware and software to install Enterprise Control Room for A2019 On-Premises.

[Adding Automation Anywhere DNS to safe recipients list](#) on page 283

To ensure secure access to Automation Anywhere Enterprise A2019 cloud services, add specific Automation Anywhere Domain Name System (DNS) to the safe recipients or allowed list.

Supported browsers for Enterprise A2019

The user interface for Enterprise A2019 (On-Premises or Cloud deployed) and for Community Edition is accessible through a browser.

Supported browsers for Enterprise A2019 and Bot agent

Access to the Enterprise A2019 is through a browser on a registered device. Registering a device includes installing the Bot agent.

Browser	Browser version
Google Chrome *	57 or later
Microsoft Internet Explorer	11
Microsoft Edge based on Chromium	79 or later

(*) Google Chrome extension: To run a bot that contains actions from the Recorder package, you must enable the Google Chrome extension that corresponds with the Recorder package version. See [Google Chrome browser extension requirements](#) on page 308.



Note: The Bot agent can be registered as a user in the Enterprise Control Room only with Google Chrome browser. However, a user can use all supported browsers (including Google Chrome) to create, edit, and deploy bots.

Supported browsers for bot tasks

Bot tasks supported by Enterprise A2019 and browser versions.

Enterprise A2019 version	Google Chrome	Microsoft Internet Explorer
Cloud Build 2545 On-Premises Build 2545 Bot agent 3.3	All bot tasks	All bot tasks
Cloud Build 2079 On-Premises Build 2079 Bot agent 2.0.2	All bot tasks, except Credential Vault	Unsupported
Cloud Build 1598 On-Premises Build 1610 Bot agent 1.0.2	All bot tasks	Debugger only

Enterprise A2019 version	Google Chrome	Microsoft Internet Explorer
Cloud Build 1082	All bot tasks	All bot tasks, except Credential Vault
On-Premises Build 1089		
Bot agent 1.0.1		

Google Chrome browser extension requirements

Ensure the Automation Anywhere Google Chrome extension you are using corresponds with the Recorder package version in your bots.

Automation Anywhere has created two versions of the Google Chrome extension, based on the Recorder package version. Automation Anywhere A2019 extension version 1.1.0.1 is the recommended Google Chrome extension for bots that contain actions from the Recorder package 2.0.6 and later. Automation Anywhere Google Chrome extension version 11 or 12 is required only to run bots that contain actions from the Recorder package 2.0.5 and earlier.

Use the table below to verify that your system is running the correct browser agent and Google Chrome extension.

- Verify the browser agent in the Windows Task Manager > Details tab.
If the browser agent is in the Task Manager, but is not running:
 1. Verify that the `ComSpec` variable is defined in the Environment Variables list.
You can locate this list in My computer > Properties > Advance System Settings > Environment Variables.
 2. If the `ComSpec` variable is not in the list, define it by specifying the Variable Name as `ComSpec` and the Variable Value as `%SystemRoot%\system32\cmd.exe`.
- Verify the Google Chrome extension version in `chrome://extensions/`.
- If necessary, install the Google Chrome extension using the links in the table below.

Google Chrome re-verification: Google Chrome requires re-verification of permissions when the Automation Anywhere Google Chrome extension is updated. If prompted, click Enable this item in the Google Chrome message. Alternatively, re-enable the extension through the links in the table above. Similarly, if you are deploying your Bot Runners from a master image, accept the permission from within that image.

Recorder package version	Browser agent	Google Chrome extension and ID
2.0.5 or earlier	<code>Automation.BrowserAgent.exe</code>	Version 11 or 12 ID: jjpdebainkangkfpbgfemnnlafkahebn
2.0.6 or later	<code>Automation.Bot.BrowserAgent.exe</code>	Version 1.1.0.1 or later ID: kammdlphdfejllopponbapgbgkikimokm



Note: If you upgrade the Bot agent version by uninstalling the Bot agent instead of directly upgrading, this also uninstalls the Google Chrome extension. In that case, you must manually reinstall the Google Chrome extension.

If you encounter an error when recording or running a bot that automates tasks in a Google Chrome browser and you have installed the Google Chrome, you must perform additional steps to configure your system. See [Google Chrome extension troubleshooting](#) on page 842.

Related reference

[Google Chrome extension troubleshooting](#) on page 842

If you encounter an error when recording or running a bot that automates tasks in a Google Chrome browser and you have installed the Google Chrome, you must perform additional steps to configure your system.

Internationalization, localization, and language support

Automation Anywhere Enterprise A2019 provides internationalization and localization support for its user interface (UI), automation, and documentation.

Internationalization means that you can automate using supported languages. Localization means the user interfaces are translated to languages supported by Automation Anywhere Enterprise. Also, when a language is supported by Automation Anywhere Enterprise, it has been tested and certified to work in that language.

Internationalization

Perform automation in various languages as Automation Anywhere Enterprise allows you work with localized operating systems and keyboards.

Product documentation

View the Automation Anywhere documentation in the supported language at <https://docs.automationanywhere.com/>. To view information in one of the supported languages, select the language from the drop-down menu at the top-right of the website. The default language is English for any topic that is not available in another language.

Interface

View the user interface for Automation Anywhere Enterprise components, including Enterprise Control Room and IQ Bot, in the supported language.

- Automate applications (web and desktop) with the language UI, text, and controls values (for example, push-button with a language name and combo-box items in language text).
- Provide the language name to a bot, workflow, and report in Enterprise Control Room.
- Provide the language name to bot schedules, automation name and description, role name and description, a user's first and last names, workload pools, and queues.
- Deploy bots with the language name on Bot Runners.
- View the language entities (names, description, and so on) across all the pages in Enterprise Control Room.

Select a language in the user interface

From the Automation Anywhere Enterprise interface, next to the user ID, click the language

icon (globe icon) and select a language from the list.

Parts of the Automation Anywhere Enterprise interfaces that are translated do not include the applications or tools that are used within the bots. For example, Microsoft Excel is not translated through the Enterprise Control Room.

Enterprise A2019 and Bot Insight

Language	Internationalization (operating system and character set)	Localization (user interface)	Product documentation
Arabic	Available	Not available	Not available
Chinese (Simplified)	Available	Available	Available
Chinese (Traditional)	Available	Available	Available
Danish	Available	Not available	Not available
Dutch (Netherlands)	Available	Not available	Not available
French	Available	Available	Available
German	Available	Available	Available
Hebrew	Available	Not available	Not available
Hungarian	Available	Not available	Not available
Italian	Available	Available	Available
Japanese	Available	Available	Available
Korean	Available	Available	Available
Polish	Available	Not available	Not available
Portuguese	Available	Available	Available
Russian	Available	Available	Not available
Spanish	Available	Available	Available
Swedish	Available	Not available	Not available
Turkish	Available	Not available	Not available

IQ Bot A2019

Language	Internationalization (operating system and character set)	Localization (user interface)	Product documentation
Arabic	Available	Not available	Not available
Chinese (Simplified and Traditional)	Available	Available	Available

Language	Internationalization (operating system and character set)	Localization (user interface)	Product documentation
French	Available	Available	Available
German	Available	Available	Available
Italian	Available	Available	Not available
Japanese	Available	Available	Available
Korean	Available	Available	Available
Portuguese	Available	Available	Available
Russian	Available	Available	Not available
Spanish	Available	Available	Available

Discovery Bot

Language	Internationalization (operating system and character set)	Localization (user interface)	Product documentation
Arabic	Available	Not available	Not available
Chinese (Simplified and Traditional)	Available	Available	Available
French	Available	Available	Available
German	Available	Available	Available
Italian	Available	Available	Not available
Japanese	Available	Available	Available
Korean	Available	Available	Available
Portuguese	Available	Available	Available
Russian	Available	Available	Not available
Spanish	Available	Available	Available

Enterprise Control Room and bot dependencies

Enterprise Control Room and bots have additional third party requirements depending upon the Automation Anywhere Enterprise options you choose. Some are optionally installed with Automation Anywhere Enterprise deployment. Some require an Automation Anywhere specific plug-in.

Enterprise Control Room third party dependencies

Install the listed dependency if you plan to use the listed supported option.

Dependency	Supported Enterprise Control Room option
Amazon Web Services Elastic Compute Cloud (EC2)	Install Enterprise Control Room platform.
HTML	For Microsoft Azure: Use Load Balancer, not Application Gateway.
Java Database Connectivity (JDBC) driver	For Oracle Database.
Linux CentOS or Red Hat Enterprise Linux	Python 3.6 required for Build 6463 and later. Install Enterprise Control Room platform.
Microsoft Active Directory	Configure as either IDaaS or IaaS. For IaaS use Windows 2016.
Microsoft Azure	Install Enterprise Control Room platform.
SMB File Share	Configure as PaaS (50 GB minimum). For Microsoft Azure installations, use Microsoft Azure SMB File Share.
Security Assertion Markup Language (SAML), version 2.0	For Single Sign-On (SSO).



Note: On new machines, physical or virtual, install Microsoft .NET Framework before your install Microsoft Office. This ensures required Primary Interop Assemblies (PIA) re-distributable are installed.

Bot third party dependencies

Install the listed dependency for the listed bot action.

Dependency	Automation Anywhere Plug-in	Supported Bot action
ABBYY FineReader Engine version 12		For capturing images in the OCR package.
Citrix Receiver Version 4.4 LTSR or later	Automation Anywhere Citrix plug-in Automation Anywhere Citrix remote agent	For bot actions on Citrix server resident apps.
HTML		For recording Web tasks using Universal Recorder. Technology support for Bot Creator.
IBM WebSEAL		For reverse proxy for Bot Runner.
Java, JRE 6, 7, and 8		For Universal Recorder.

Dependency	Automation Anywhere Plug-in	Supported Bot action
Microsoft Active Accessibility (MSAA)		Supported with Universal Recorder. To import/export datasets Technology support for Bot Creator.
Microsoft Cognitive Services Text Analytics API		For Microsoft LUIS NLP package language support.
Microsoft .NET Framework version 4.6.1		For the Recorder package.
Oracle Java versions: 1.6 (JRE 1.6.0_45), 1.7 (JRE 1.7.0_80), or 1.8(JRE 1.8_111) - Desktop and Web.		For recording Web tasks using Universal Recorder. Desktop (standalone) Java applications (running on JRE 6 or later versions) do not require the Automation Anywhere Java plug-in. Technology support for Bot Creator.
Proxy service		For web service commands.
SAP GUI version 750 with patch 9, version 760 with patch 0, or version 760 with patch 5		To connect with a SAP environment.
SMB File Share		Configure as PaaS (50 GB). For Microsoft Azure installations, use Microsoft Azure SMB File Share.
Terminal emulator. Types: • TN3270 • TN5250		To access and control terminal hosts.
Windows Communication Foundation (WCF), Transport Layer Security (TLS)		For secure communications with Bot Runner.

Supported special characters

Use only supported special characters when creating user names and passwords. Supported characters vary depending upon where they are used.

In all of the below listed cases, the standard alphanumeric characters, a-z, A-Z, 0-9 are supported. The special characters allowed or specifically excluded from particular use are typical to standard English keyboards. See the table below to verify the special characters that can be used in names or passwords.

TLS certificate

Do not use at sign (@) in passwords

Wildcards

The asterisk (*) is supported.

Windows	Do not use the pipe () or semicolon (;) in user names or passwords.
Worksheet	Do not use the asterisk (*), question mark (?), or bracket left or right ([]) in the worksheet name.
Database	Do not use percent (%) or space () in the database name. Do not use semicolon (;) in the database username or password.

Supported characters

Characters supported for authentication are acceptable for both user names and passwords. In the table:

- Supported means the character is explicitly supported for that use.
- Do not use means the character is explicitly not supported for that use.
- Double dash (--) means results with using the character for that use are unknown.

Character	Windows authentication	Enterprise Control Room authentication	Database name, username, or password	JSON Web Token authentication
ampersand (&)	Supported	Supported	--	Supported
angle bracket, left or right (< >)	Supported	--	--	--
apostrophe, straight single (')	Supported	--	--	--
asterisk (*)	Supported	--	--	--
at sign (@)	Supported	Supported	--	Supported
braces left or right ({ })	Supported	--	--	--
bracket left or right ([])	Supported	--	--	--
caret (^)	Supported	--	--	--
colon (:)	Supported	--	--	--
dollar sign (\$)	Supported	Supported	--	Supported
equal sign (=)	Supported	--	--	--
exclamation point (!)	Supported	Supported	--	Supported
hyphen (-)	Supported	Supported	Supported	Supported
parenthesis, left or right (())	Supported	--	--	--
percent (%)	Supported	Supported	Do not use	Supported
period (.)	Supported	Supported	Supported	Supported
pipe ()	Do not use	--	--	--

Character	Windows authentication	Enterprise Control Room authentication	Database name, username, or password	JSON Web Token authentication
plus sign (+)	Supported	--	--	--
number sign (#)	Supported	Supported	--	Supported
question mark (?)	Supported	--	--	--
semicolon (;)	Do not use	--	Do not use	--
slash, forward or backward (/ \)	Supported	--	--	--
space	Supported	--	Do not use	--
underscore (_)	Supported	Supported	Supported	Supported

Citrix integration on Cloud

Automation Anywhere Enterprise integration with Citrix enables you to create bots that run tasks on remote Citrix Virtual Apps servers.

Process overview

Ensure the following tasks are completed before you begin automating tasks in a Citrix environment:

Verify credentials and licensing

- Ensure you have the credentials to access the Citrix server.
- Ensure the appropriate Citrix license is available for the Automation Anywhere Enterprise system.

Install components

Specific Citrix and Automation Anywhere Enterprise components are required on both the local user machine and the Citrix Virtual Apps server.

Local machine

1. Install Citrix Receiver.
2. Install the Bot agent. This is automatically installed when you register the local machine with the Enterprise Control Room.

The Bot agent and Automation Anywhere plug-in for Citrix are installed at the

same time if the Citrix Receiver is installed on the local machine.

3. Install the Automation Anywhere plug-in for Citrix.

If the Bot agent is already installed, the Automation Anywhere plug-in for Citrix is automatically installed when the Universal Recorder is initiated.

Citrix server

1. Install the Automation Anywhere remote agent for Citrix.
2. Register the Automation Anywhere remote agent for Citrix as a Virtual App in the Citrix StoreFront.

Create a bot

1. From the Citrix StoreFront, run the AARemoteAgent and the target application.
2. From the Enterprise Control Room, create the bot, start the Recorder, select the target application, and record your actions on the Citrix server to build your bot.

Using Citrix architecture with bots

To create and run bots using applications that reside on a Citrix server, see the following resources:

[Using the Recorder on Citrix Virtual Apps servers on page 317](#)

The Record: Capture cloning action requires specific configurations to capture objects from applications available through the Citrix StoreFront on a remote Citrix Virtual Apps server. Ensure the required components are installed on the local machine and the remote Citrix Virtual Apps server.

Related tasks

[Using the Recorder on Citrix Virtual Apps servers on page 317](#)

The Record: Capture cloning action requires specific configurations to capture objects from applications available through the Citrix StoreFront on a remote Citrix Virtual Apps server. Ensure the required components are installed on the local machine and the remote Citrix Virtual Apps server.

[Using Citrix XenDesktop on Cloud](#)

[Installing the Citrix required components on local machines](#) on page 318

Install the Automation Anywhere Enterprise components to enable you to use bots on Citrix Virtual Apps servers. Two components are installed: Bot agent and Automation Anywhere plug-in for Citrix.

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#) on page 319

Install the Automation Anywhere remote agent for Citrix on the Citrix Virtual Apps server where the virtualized applications are installed.

Using the Recorder on Citrix Virtual Apps servers

The Record: Capture cloning action requires specific configurations to capture objects from applications available through the Citrix StoreFront on a remote Citrix Virtual Apps server. Ensure the required components are installed on the local machine and the remote Citrix Virtual Apps server.

Complete the steps listed in the following tasks:

- [Installing the Citrix required components on local machines](#) on page 318
- [Installing Automation Anywhere remote agent for Citrix on Citrix servers](#) on page 319

Create bots with applications running on a remote Citrix Virtual Apps server using the Automation Anywhere remote agent for Citrix.

1. Log in to the Citrix Virtual Apps server StoreFront.
2. Run the Automation Anywhere remote agent for Citrix: Select Citrix server > Citrix StoreFront > AARemoteAgent.
AARemoteAgent is the Citrix name for the Automation Anywhere remote agent for Citrix.
3. Run the target application from the Citrix StoreFront.
4. Log in to your registered local machine with the Bot agent and Citrix Receiver installed.
5. Log in to the Enterprise Control Room from your registered local machine.
6. Create a new bot or edit an existing bot.
7. Select the auto login feature to log in to a Citrix environment when it is locked or logged off.



Note: To ensure the auto login works, always log off the Citrix Receiver associated with the Citrix Virtual Apps server before you disconnect.

8. Start the Recorder.
9. From the Automation Anywhere Record Application selection window, select the target application from the drop-down list in the Window or URL field, and click Start recording.



Note: The remote application has \\Remote label at the end of the application name.

10. When the steps to record are completed, click End recording.

Related concepts

[Citrix integration on Cloud](#) on page 315

Automation Anywhere Enterprise integration with Citrix enables you to create bots that run tasks on remote Citrix Virtual Apps servers.

Related tasks

[Installing the Citrix required components on local machines](#) on page 318

Install the Automation Anywhere Enterprise components to enable you to use bots on Citrix Virtual Apps servers. Two components are installed: Bot agent and Automation Anywhere plug-in for Citrix.

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#) on page 319

Install the Automation Anywhere remote agent for Citrix on the Citrix Virtual Apps server where the virtualized applications are installed.

[Using Citrix XenDesktop on Cloud](#)

Installing the Citrix required components on local machines

Install the Automation Anywhere Enterprise components to enable you to use bots on Citrix Virtual Apps servers. Two components are installed: Bot agent and Automation Anywhere plug-in for Citrix.

1. Log in to your local machine.
2. Install Citrix Receiver.
This Citrix component is required to communicate from a local machine to a Citrix virtual application server.
To install the Citrix Receiver, see the Citrix documentation.
3. Register your local machine with the Enterprise Control Room. This installs the Bot agent.
The Bot agent enables local machine communication with the Enterprise Control Room.
To install the Bot agent:
 - a) Log in to the Enterprise Control Room through your Automation Anywhere Enterprise URL.
 - b) Navigate to MY DEVICES.
 - c) From the action icons, click Add local bot agent.
 - d) Click Connect to my computer.
 - e) Follow the steps outlined in the wizard.
 - f) Refresh the My Devices page and verify that the local device is added.
4. Install Automation Anywhere plug-in for Citrix on your local machine.
The Automation Anywhere plug-in for Citrix provides the Citrix driver. This driver communicates with the Citrix server.
To install the Automation Anywhere plug-in for Citrix:
 - a) Log in to the Enterprise Control Room.
 - b) Launch one of the designated events.
Designated events include: launch Recorder, use the Devices tab or Device Status tab, or run a bot from Editor.
 - c) Optional: Verify that the Automation Anywhere plug-in for Citrix is installed.
Check for the file `C:\Program Files (x86)\Citrix\ICA Client\Automation.CitrixDriver.dll`.

Related concepts

[Citrix integration on Cloud](#) on page 315

Automation Anywhere Enterprise integration with Citrix enables you to create bots that run tasks on remote Citrix Virtual Apps servers.

Related tasks

[Using the Recorder on Citrix Virtual Apps servers](#) on page 317

The Record: Capture cloning action requires specific configurations to capture objects from applications available through the Citrix StoreFront on a remote Citrix Virtual Apps server. Ensure the required components are installed on the local machine and the remote Citrix Virtual Apps server.

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#) on page 319

Install the Automation Anywhere remote agent for Citrix on the Citrix Virtual Apps server where the virtualized applications are installed.

[Using Citrix XenDesktop on Cloud](#)

Installing Automation Anywhere remote agent for Citrix on Citrix servers

Install the Automation Anywhere remote agent for Citrix on the Citrix Virtual Apps server where the virtualized applications are installed.

1. Log in to the Citrix Virtual Apps server.
2. Download the latest version of the Automation Anywhere remote agent for Citrix installer file to the Citrix Virtual Apps server.

The Automation Anywhere remote agent for Citrix running on the Citrix server interprets data received from Automation Anywhere Enterprise and responds appropriately.

- a) Go to [A-People Downloads page \(Login required\)](#).
 - b) Select and download the Automation Anywhere remote agent for Citrix.
3. Run the Automation Anywhere remote agent for Citrix installer.
 - a) Extract the `AARemoteAgent.zip` file and double-click the `AAE_Remote_Agent_1.0.0.exe` file.
 - b) On the Automation Anywhere Remote Agent Setup screen, click Next.
 - c) On the License Agreement screen, accept the license agreement, and click Next.
 - d) On the Select Destination Folder screen, click Browse to specify a non-default location for installing the remote agent. Click Next.
The default location for installation is set to: `C:\Program Files (X86)\Automation Anywhere\AARemoteAgent`
 - e) On the Setup Status screen, track the status of the installation process.
 - f) On the Setup Wizard Complete screen, click Finish to complete the setup.
 4. From the Citrix interface, add the Automation Anywhere remote agent for Citrix application to the Citrix Delivery Controller.
This registers the Automation Anywhere remote agent for Citrix as a Virtual App in the Citrix StoreFront.
 5. Verify that the Automation Anywhere remote agent for Citrix is available from the Citrix StoreFront.
The Citrix StoreFront name for the Automation Anywhere remote agent for Citrix is `AARemoteAgent`.

Related concepts

[Citrix integration on Cloud](#) on page 315

Automation Anywhere Enterprise integration with Citrix enables you to create bots that run tasks on remote Citrix Virtual Apps servers.

Related tasks

[Using the Recorder on Citrix Virtual Apps servers](#) on page 317

The Record: Capture cloning action requires specific configurations to capture objects from applications available through the Citrix StoreFront on a remote Citrix Virtual Apps server. Ensure the required components are installed on the local machine and the remote Citrix Virtual Apps server.

[Installing the Citrix required components on local machines](#) on page 318

Install the Automation Anywhere Enterprise components to enable you to use bots on Citrix Virtual Apps servers. Two components are installed: Bot agent and Automation Anywhere plug-in for Citrix.

Using Citrix XenDesktop on Cloud

Automation Anywhere Enterprise deployment models

Automation Anywhere Enterprise provides multiple deployment options to meet various levels of enterprise cost/price performance and resiliency requirements. This includes installation on single-nodes, highly available (HA) clusters, and disaster recovery (DR) sites.

Planning

Identify your key requirements before selecting a deployment model. For best results, deploy the same operating systems across the Automation Anywhere Robot Process Automation (RPA) development, testing, and production environments. At minimum, have the exact same OS on both test and production environments.

Deployment models

At a high-level, there are three (3) ways to deploy or install Automation Anywhere. Each depends on your business continuity requirements.

[Single-node deployment](#) on page 320

A single-node deployment hosts the Enterprise Control Room only on one server or machine.

[High availability deployment](#) on page 322

The high availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases using a distributed load balancer.

[Disaster recovery deployment](#) on page 325

The disaster recovery (DR) deployment model uses high availability (HA) clusters distributed across separate geographic areas.

Related concepts

[High availability and disaster recovery deployments](#) on page 321

High availability (HA) provides a failover solution if an Enterprise Control Room service, server, or database fails. Disaster recovery (DR) provides a recovery solution across a geographically separated distance in the event of a disaster that causes an entire data center to fail.

Single-node deployment

A single-node deployment hosts the Enterprise Control Room only on one server or machine.

A single-node deployment can be used for proof-of-concepts, demos, testing, and trial runs.

We do not recommend the use of single-node deployment for production as it might impact RPA operations and business continuity because of the following reasons:

- No disaster recovery (single point of failure) - If the single node fails, RPA operation will be adversely impacted.
- No high availability - If the server is taken offline for upgrades or maintenance, RPA operations will be impacted.
- No RPA up-scaling - When RPA deployments scale up and users increase, the single node will have to manage the increased load. This might adversely affect the RPA performance.

The primary advantages of single-node deployments include:

- Quick and easy installation and setup

- Additional servers are not required.
- Load balancers and clustering configuration are not required

Related concepts

[High availability deployment](#) on page 322

The high availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases using a distributed load balancer.

[Disaster recovery deployment](#) on page 325

The disaster recovery (DR) deployment model uses high availability (HA) clusters distributed across separate geographic areas.

High availability and disaster recovery deployments

High availability (HA) provides a failover solution if an Enterprise Control Room service, server, or database fails. Disaster recovery (DR) provides a recovery solution across a geographically separated distance in the event of a disaster that causes an entire data center to fail.

Overview

The Automation Anywhere implementation of high availability and disaster recovery reduces downtime and maintains continuity of business (CoB) for your automation and bot deployment activities.

High availability	Refers to a system or component that is continuously operational for a desirably long period.
Disaster recovery	Involves a set of policies and procedures to enable the recovery or continuation of vital infrastructure and systems following a natural or human-induced disaster.

The Automation Anywhere components and configuration leverage your existing HA and DR infrastructure, load balancing, and failover systems to protect your bots and related data. Contact your data center administrator for your approved local HA and DR procedures.

Required HA and DR infrastructure components

Distributed approach	The Enterprise Control Room provides the flexibility to process a large number of requests. Deploy multiple instances of Enterprise Control Room on multiple physical or virtual servers as required. Enterprise A2019 On-Premises prerequisites on page 286
Load balancing	Performed by a load balancer, this is the process of distributing application or network traffic across multiple servers to protect service activities, allowing workloads to be distributed among multiple servers. This ensures bot activity continues on clustered servers.

Databases

[Load balancer requirements](#) on page 301

Databases use their own built-in failover to protect the data. This ensures database data recovery.

Configure synchronous replication between the primary (active) and secondary (passive) clustered Microsoft SQL servers in the data center. This ensures consistency in the event of a database node failure.

For synchronous replication, configure the database using publisher and subscriber model in Microsoft SQL Server from the primary disaster recovery site to the secondary disaster recovery site that is at a geographically separated location from the primary site.

[Replicate data between primary and secondary sites](#) on page 327

Related concepts

[High availability deployment](#) on page 322

The high availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases using a distributed load balancer.

[Disaster recovery deployment](#) on page 325

The disaster recovery (DR) deployment model uses high availability (HA) clusters distributed across separate geographic areas.

High availability deployment

The high availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases using a distributed load balancer.

Based on your resiliency requirements for Enterprise A2019, choose from the following deployment options:

Single/one node

This deployment model is not considered high availability with only one Enterprise Control Room node configured in the data center.

Three nodes

This deployment model is considered full high availability with three Enterprise Control Room nodes configured in the data center cluster. This is the minimum required deployment model because it supports one node failure at a time.

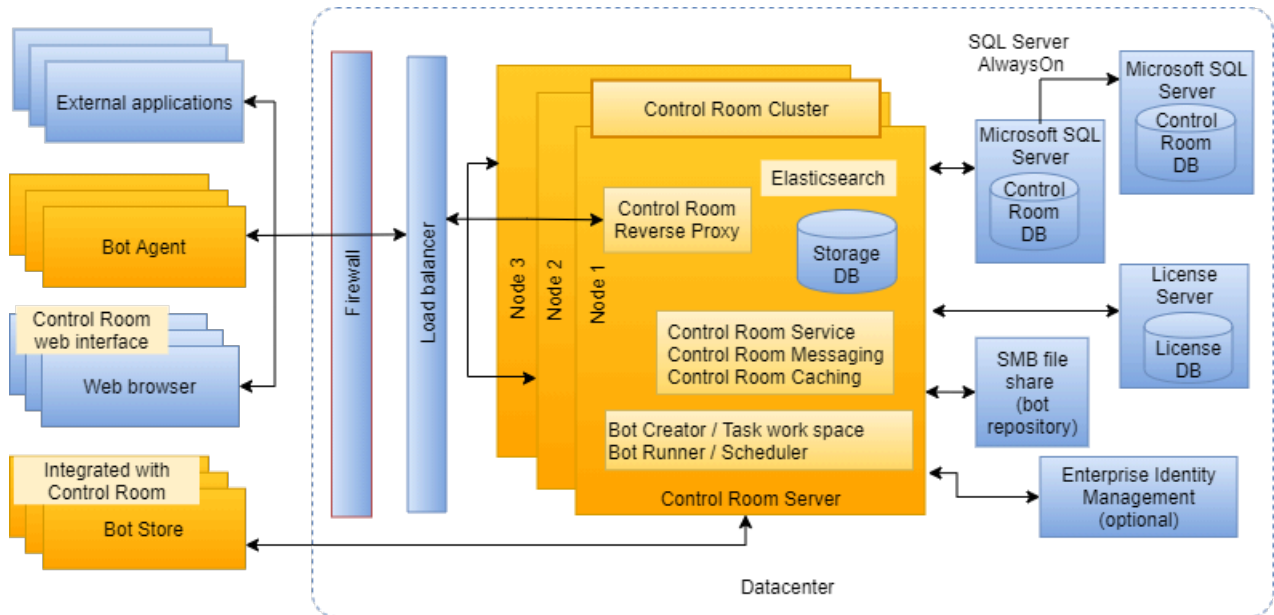
In Enterprise A2019, a cluster comprising two nodes is referred to as multi-master mode. The multi-master mode can merge inconsistencies but can result in a split-brain condition where the cluster has no majority and cannot resolve transactions, which might result in data inconsistencies. Split-brain condition is a known limitation of clustering systems that can be caused by network issues including latency.

A three-node configuration can help avoid split-brain issues with two-node clusters and

increase security by using node authentication and transport layer security (TLS) features.

Enterprise A2019 uses Elasticsearch for distributed operational message storage including audit log messages and application logs. Elasticsearch supports fast query, analytics, and a distributed cluster configuration for redundancy and fail-safe operation.

The following image shows the Automation Anywhere and data center components for three nodes in a data center cluster:



In this example, the Enterprise Control Room servers and Microsoft SQL Servers have HA redundancy.

- Multiple users have access to the Enterprise Control Room cluster through their web browsers. The web browsers communicate to the Enterprise Control Room cluster through the load balancer.
- [High availability cluster configuration](#) on page 324
- Multiple devices communicate to the Enterprise Control Room cluster through the load balancer.
- The server message block (SMB) file share and the Microsoft SQL Server store data from the Enterprise Control Room cluster.
- Microsoft SQL Server uses redundancy through replication syncing to the clustered Microsoft SQL Server.



Important: Automation Anywhere does not support stretch clusters.

- Ensure that all the HA cluster nodes are configured in the same location. Do not configure the nodes in a single HA cluster that is located across various sites. Ensure that you configure one HA cluster at the primary site and the other HA cluster at the secondary site.
- The Enterprise Control Room and IQ Bot must be configured in the same data center to ensure communication between both the applications.

Pros

Maintains availability when server failures occur within a single data center.

Cons Does not provide protection against data center outage.

Use cases Small to medium size businesses that do not require multi-site disaster recovery.

Related concepts

[Disaster recovery deployment](#) on page 325

The disaster recovery (DR) deployment model uses high availability (HA) clusters distributed across separate geographic areas.

Related reference

[High availability cluster configuration](#) on page 324

To support Automation Anywhere in your data center, configure an high availability (HA) cluster. Follow your company methods and procedures for implementing your data center cluster.

Related information

[Cluster coordination in ElasticSearch](#)

High availability cluster configuration

To support Automation Anywhere in your data center, configure an high availability (HA) cluster. Follow your company methods and procedures for implementing your data center cluster.

High availability deployments with clustering

Enterprise A2019 can be deployed in high availability mode where multiple Enterprise Control Room instances are clustered together using a distributed load balancer. The cluster configuration provides operational fault tolerance because the clustered Enterprise Control Room can continue to function even when one or more nodes in the cluster experience a failure.

The cluster functions by coordinating transactions between all participating Enterprise Control Room nodes. The nodes determine which transaction can be processed through voting on each transaction. The number of votes constituting a majority of the nodes in the cluster is referred to as a quorum and determines how many nodes have to vote for or confirm a transaction before it can be processed.

Fault tolerance in terms of node failure is determined by how many nodes can fail before a quorum or majority of nodes is not available to vote on the validity of any transaction. Fault tolerance is optimized with an odd number of nodes in the cluster because a majority in odd-numbered clusters is a lower number than in even-numbered clusters, as shown in the following table:

Number of nodes in cluster	Majority (quorum)	Fault tolerance (node failures)
3	2	1
4	3	1
5	3	2
6	4	2

A cluster with three or more node is much less susceptible to a split-brain condition or inconsistencies due to network issues because the quorum configuration is enforced by default.

High availability components

To support HA and DR for Automation Anywhere, configure the selected components in your data center for HA.

- Cluster components - A cluster is a set servers (nodes) that are connected by physical cables and software. In an HA environment, these clusters of servers are allowed to be in the same physical data center.



Note: In the context of clusters, though the terms server, host, and node each have specific meaning, they are frequently used interchangeably.

- Cluster group (role) - Group of clustered services that fail-over together and are dependent on each other.
- Host - The cluster machine that is hosting the services.
- Node - A generic term for a machine in a cluster.
- Primary node - The active node in the cluster. The machine where the production activities run.
- Secondary node - The machine that is designated as the target in the event of a fail-over. The secondary node is a passive duplicate of the primary node.
- Server - The machine in the cluster installed with the server operating system.

HA cluster technologies guard against three specific types of failures:

- Application and service failures—affecting application software and essential services.
- Site failures in multisite organizations—caused by natural disasters, power outages, or connectivity outages.
- System and hardware failures—affecting hardware components such as CPUs, drives, memory, network adapters, and power supplies.

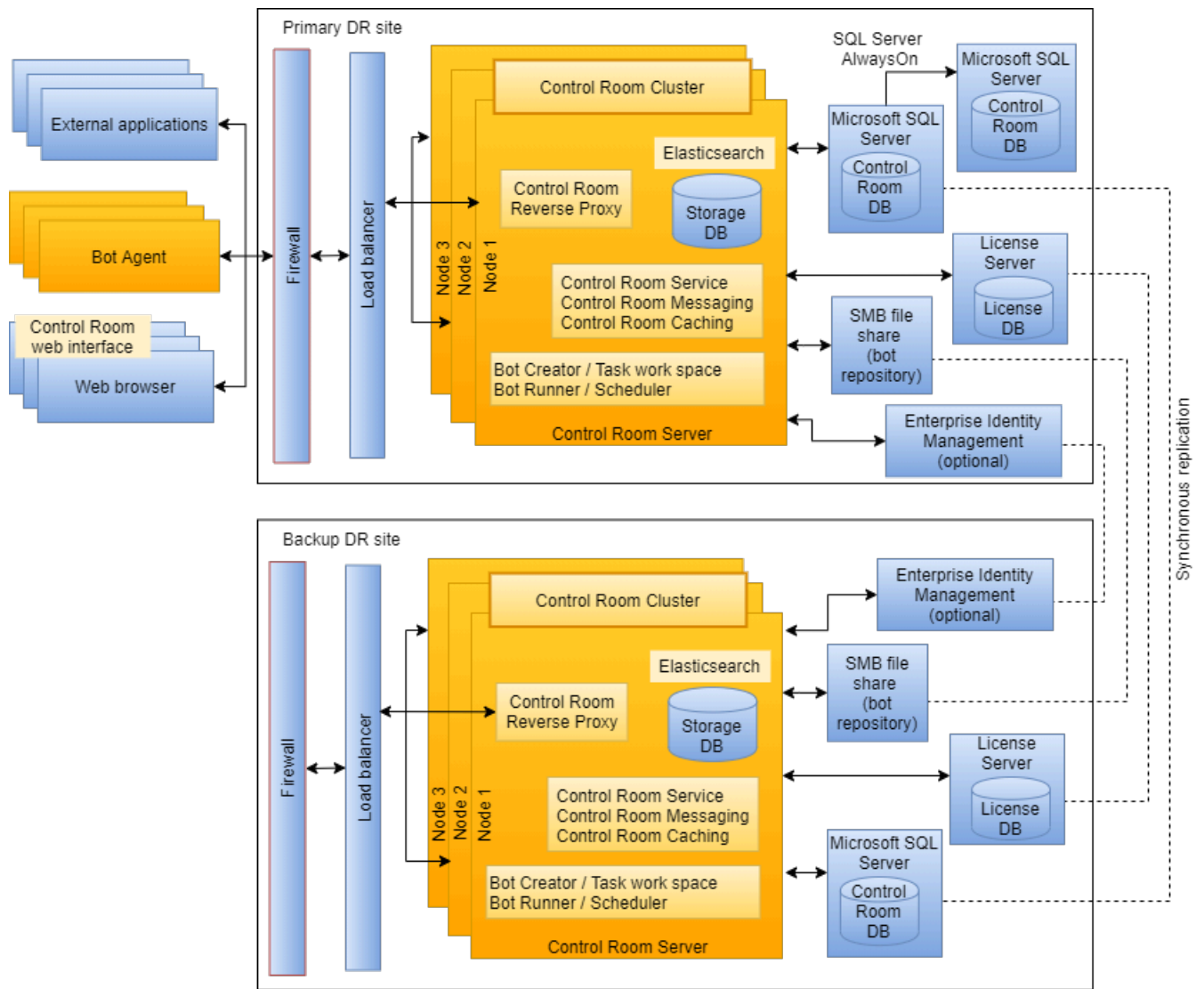
This ability to handle failure allows clusters to meet two requirements that are typical in most data center environments:

- High availability - the ability to provide end users with access to a service for a high percentage of time and reduces unscheduled outages.
- High reliability - the ability to reduce the frequency of system failure.

Disaster recovery deployment

The disaster recovery (DR) deployment model uses high availability (HA) clusters distributed across separate geographic areas.

Disaster recovery (DR) is a method where the two high availability (HA) data center configurations are separated geographically. In the event of a localized disaster at the primary site, the physically removed data center on the secondary site can resume functions with minimum downtime.



Advantage

- Provides business continuity when there is a data center outage or loss.
- Protects and safeguards critical business data.
- Ensures information security compliance.

Disadvantage

- Increased operational burden.

Related tasks

[Replicate data between primary and secondary sites](#) on page 327

Replicate the data between the primary and secondary sites. This process involves database replication using publisher and subscriber models in Microsoft SQL Server Management Studio, server repository replication using Windows Distributed File System (DFS), and backing up Elasticsearch (audit log) data.

Related reference

[Disaster recovery configuration](#) on page 326

When you configure disaster recovery enabled data centers for Automation Anywhere Enterprise, ensure specific conditions are met.

Disaster recovery configuration

When you configure disaster recovery enabled data centers for Automation Anywhere Enterprise, ensure specific conditions are met.

- Primary site: Ensure the primary site is up and running with HA optionally configured.
- Primary site components: Ensure the primary site has components such as database, repository, and Elasticsearch data folder configured.
- AD domain: Ensure the same Active Directory domain is available to both the primary and secondary sites.
- Site domains: Ensure the secondary site Enterprise Control Room and machines are members of the same domain as the primary site Enterprise Control Room and machines.
- Licenses: Assign floating licenses for users so that they can log in to devices on the backup site.
- Secondary site services: Shut down the Enterprise Control Room services at the secondary site until they are required.
- Site configurations: Ensure the machines at the primary site and secondary site have the same specification and configuration. This includes the Enterprise Control Room, Bot Runners, associated devices, and login credentials. This is a requirement to ensure an equal level of service during an outage.
- Schedules: Ensure schedules, after they are created, are stored in the database in UTC format. This ensures the schedules run as specified in the production environment.



Note: Schedules are stored in Coordinated Universal Time (UTC) and therefore run at the same time, regardless of the physical location or time zone settings of the server.

- Bot agent: Ensure the secondary site Bot agent have the exact same configurations as the primary site Bot agent they are mapped to.

Related tasks

[Replicate data between primary and secondary sites](#) on page 327

Replicate the data between the primary and secondary sites. This process involves database replication using publisher and subscriber models in Microsoft SQL Server Management Studio, server repository replication using Windows Distributed File System (DFS), and backing up Elasticsearch (audit log) data.

[Perform disaster recovery failover](#) on page 328

Perform the required failover steps for Automation Anywhere Enterprise recovery at the physically remote secondary site after a disaster at the primary site.

Replicate data between primary and secondary sites

Replicate the data between the primary and secondary sites. This process involves database replication using publisher and subscriber models in Microsoft SQL Server Management Studio, server repository replication using Windows Distributed File System (DFS), and backing up Elasticsearch (audit log) data.

Before installing Automation Anywhere Enterprise, ensure that you have set up your secondary site.

Configure the database and shared repository in the secondary site that is used for disaster recovery.

Back up your Elasticsearch data by setting up the backup cluster.

1. Replicate the database from the primary site to the secondary site using the publisher and subscriber models in Microsoft SQL Server Management Studio.



Recommendations:

- Use the Microsoft SQL Server Developer or Enterprise edition for database replication.
The publisher and subscriber versions should be the same, or the gap between the two versions should not be more than two releases. For example, do not use Microsoft SQL Server 2012 publisher with Microsoft SQL Server 2019 subscriber.
- Configure the publisher and distributor on the same machine to avoid latency in data sharing.

Use different machines only for load distribution, for example, for data larger than 200 GB.

- a) Connect to the primary database to create a snapshot publication for your local publications.
- b) Add the tables and views as articles.
- c) Use the snapshot agent option to create a snapshot and keep the snapshot available to initialize subscriptions.
- d) Schedule the snapshot agent to back up the data at regular intervals (for example, every 10 seconds from 12 AM to 11:59:59 PM).
- e) To select the account to run the snapshot agent, configure the security and agent settings.
- f) Add a publication option.
- g) Run all agent and distributors after ensuring the publisher and database names are correct.
- h) To add subscribers to the local subscriptions, connect to the database server and provide connection details for the database at the secondary site.

For detailed steps, see [Database Mirroring and Replication \(SQL Server\)](#).

2. Replicate the repository (bots and data files) using the Windows Distributed File System (DFS) from the primary site to the secondary site.
 - a) Open the Distributed File System on the machine where the shared repository is saved.
 - b) Create a new multipurpose replication group to add replication group members.
The group members include the source machine in the primary site and the destination machine in the secondary site to store the shared repository.
 - c) Use the full mesh option for DFS replication groups composed of less than 10 servers.
 - d) Use the full bandwidth option to replicate the data continuously.
 - e) Add the machine where you are configuring the repository as a primary member.
 - f) Add a backup folder for the shared repository from the destination machine.
 - g) Verify the data is replicated in the backup folder on the destination machine.

For detailed steps, see [Distributed File System Replication](#).

3. Back up the Elasticsearch (audit log) data by adding the secondary site cluster IP address in the Enterprise Control Room on the primary site.

For detailed steps, see [Configure disaster recovery site for Elasticsearch IP addresses](#) on page 375.

In case of a disaster, [Perform disaster recovery failover](#) on page 328.

Related tasks

[Perform disaster recovery failover](#) on page 328

Perform the required failover steps for Automation Anywhere Enterprise recovery at the physically remote secondary site after a disaster at the primary site.

Perform disaster recovery failover

Perform the required failover steps for Automation Anywhere Enterprise recovery at the physically remote secondary site after a disaster at the primary site.

Complete the disaster recovery deployment on the two geographically separated sites, where one site is the primary (active) site and the other is the secondary (passive) site used for backup. If the primary site cluster fails, perform recovery on the secondary site.



Recommendation: The secondary site should be set up as a passive configuration so that the failover procedure can be performed without delay.

The procedure is identical regardless of whether you are switching over from primary to secondary, or from the secondary to primary sites. Connect the Enterprise Control Room to the replicated database and shared the repository on the secondary site.

These steps apply to all the servers in the Enterprise A2019 cluster, including the Enterprise Control Room servers, SQL server, and Elasticsearch server.

1. Install Enterprise A2019 on the secondary site.
Follow the steps for installation up to the database configuration.
[Installing Enterprise Control Room using Custom mode](#) on page 330
2. In the Database Configuration window, add database details for the secondary site such as the database server IP address and default port number.
[Configure database type and server](#) on page 335
3. Verify the Elasticsearch details in the Provide Elasticsearch Credentials window.
Because the Elasticsearch data is already replicated from the primary database, you do not have to provide the Elasticsearch password.
4. After the installation is complete, verify that the Enterprise Control Room URL and repository path is available in the Enterprise Control Room Welcome page.
You can change the Enterprise Control Room URL and repository path after you log in to the Enterprise Control Room as the next step.
5. Log in to the Enterprise Control Room using your administrator credentials to change the Configuration Settings in Administration > Settings:
 - a) To allow users to access the Enterprise Control Room using a public IP address, change the Control Room Access URL settings to point to the secondary site access URL in General Settings > General.
 - b) Change the Repository path to the secondary site repository path in Control Room database and software > Control Room repository.
6. Verify the data for the following:
 - Users, roles, schedule, triggers, credential information, and workload settings
 - Elasticsearch certificate and connectivity
 - Automation Anywhere Robotic Interface, Bot Insight, Discovery Bot, and IQ Bot



Recommendation: Perform a byte-by-byte measurement of the recovered data and compare the primary and secondary site data. If you see any difference, verify the subscriber logs for any intermittent failure due to any network issue.

After the recovery site is operating as the primary site, configure a replacement secondary site. Using the database tools, set up replication from the recovery primary site to the replacement secondary site.

Installing Enterprise Control Room using Custom mode

Log in to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Custom Mode to select installation and configuration options, including installing non-default requirements. Select this mode for a data center deployment.



Linux users: See [Installing Enterprise Control Room on Linux](#) on page 359.

Step 1: Prepare for installation

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file

Step 2: [Run Enterprise Control Room installer](#) on page 331

Run the installer to verify the operating system and hardware requirements, select the deployment option, accept the licensing agreement, and select the installation file path.

Step 3: [Configure IP cluster](#) on page 332

Continue from the Enterprise Control Room installer to the Cluster Configuration wizard page. Use this page to set up the system IP addresses for configuring the Enterprise Control Room on a single node or multiple nodes (high availability).

Step 4: [Configure application Transport Layer Security](#) on page 333

Continue from the Enterprise Control Room installer to the Transport Layer Security (TLS) configuration wizard page. Use this configuration page to generate a self signed certificate on HTTP or import a security certificate to setup a highly secure Enterprise Control Room instance.

Step 5: [Configure service credentials](#) on page 334

Continue from the Enterprise Control Room installer to the Service Credentials wizard page. Use the Service Credentials page to specify the account that will be used to run all Windows services that are created by Automation Anywhere installer.

Step 6: [Configure database type and server](#) on page 335

Continue from the Enterprise Control Room installer to the Database type wizard page. Use this page to configure the Microsoft SQL Server database for use with the Enterprise Control Room.

Step 7: [Add Elasticsearch credentials](#) on page 337

When installing Enterprise A2019, add Elasticsearch credentials for enhanced monitoring and alerting in the Enterprise Control Room.

Step 8: [Review the installation summary](#)

Continue from the Enterprise Control Room installer to the Ready to Install the Program wizard page. From this stage of the installation wizard,

Step 9: Complete Enterprise Control Room configuration and validation

you finish the installation wizard and monitor the installation progress.

[Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

[Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

Step 10: Prepare for users

[User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Related concepts

[Understanding Enterprise A2019 migration](#) on page 430

The migration feature enables you to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 10.x or 11.x to Enterprise A2019. The migration capability is available in Enterprise A2019 from Build 2079 onwards for On-Premises deployment.

Run Enterprise Control Room installer

Run the installer to verify the operating system and hardware requirements, select the deployment option, accept the licensing agreement, and select the installation file path.

To install Automation Anywhere Enterprise Control Room in Custom Mode, follow these steps:

1. Start the installer wizard.
 - a) Extract all files from the `AutomationAnywhere_Setup.zip` file.

- b) Right-click the *AutomationAnywhere.exe* file and select Run as administrator.

The installation process utilizes your SQL database server instance that is used for the Enterprise Control Room and the Bot Insight databases to create a database with the name AAE-Database and configures the database as the default Enterprise Control Room database.

The installation process checks for supported operating system and recommended hardware requirements. The following message appears if the requirements are not met:

This system does not meet all the installation prerequisites for Automation Anywhere Enterprise. Some features might not work as expected after installation. For details, verify the Control Room Installation Prerequisite.

For more information, see [Enterprise A2019 On-Premises prerequisites](#) on page 286.

2. Select one of the following deployment types and click Next:

Deployment type	Description
On-Premises	The Enterprise Control Room, Bots and files are installed on your servers.
Cloud-enabled	All data such as bots and files are installed on your servers. The management functions of the Enterprise Control Room are delivered through Cloud.

3. Accept the licensing agreement and click Next.

4. Select the Custom option and click Next.

The Destination Folder page appears. By default, the destination folder is C:\Program Files\Automation Anywhere\Enterprise\.

5. To make changes to the destination folder, click Change, enter a new destination folder name, and click OK.



Recommendation: Do not install the application directly in the root directory (C:\). You should create a folder, for example, C:\Program Files\Automation Anywhere\Enterprise\.

6. Click Next to [configure the IP cluster](#).

Configure IP cluster

Continue from the Enterprise Control Room installer to the Cluster Configuration wizard page. Use this page to set up the system IP addresses for configuring the Enterprise Control Room on a single node or multiple nodes (high availability).

To install the Enterprise Control Room in cluster mode:

- Ensure the network location (UNC) path is configured to access the repository files from all Enterprise Control Room nodes in the cluster.
- Ensure that all nodes that will be configured for the IP cluster are available for configuration before the installation. Also, provide the same list of IP addresses in the same order in all the nodes that are of the cluster when you install Enterprise Control Room in these nodes.



Remember: Before you upgrade from a previous version, shut down the nodes gradually, and not at the same time, to ensure that the cluster does not fail.

1. Select the Enable Cluster Setup check box.

The check box is enabled by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room on a single node and not a cluster, clear the Enable Cluster Setup check box.

2. Enter the IP addresses of the nodes in the cluster.
 - a) Use a comma (,) to specify more than one IP address.
For example, to specify three IP addresses in the cluster, enter:
192.0.2.1, 192.0.2.2, 192.0.2.3



Important: The first IP address in the list is used as the master node. Ensure that you enter the IP addresses in the same order on all node configurations in subsequent installations. An incorrect order causes the application to configure the IP addresses as separate clusters, which will result in data loss when the issue is fixed after installation.

You can install multiple nodes at the same time after the master node is initially installed.

After installation, you can add a new IP address to the cluster at the end of the list.

- b) After you enter the cluster IP addresses correctly, select a valid address IP at the message prompt to provide network access to the machine.
3. Select a private IP address from the Local IP Address drop-down list.
If multiple local IP addresses are configured on the machine, select the IP address on which the Enterprise Control Room is installed because it will be used by other nodes to access the Enterprise Control Room.
4. Click Next to configure the application layer security.
[Transport Layer Security \(TLS\)](#)

Related tasks

[Configure application Transport Layer Security](#) on page 333

Continue from the Enterprise Control Room installer to the Transport Layer Security (TLS) configuration wizard page. Use this configuration page to generate a self signed certificate on HTTP or import a security certificate to setup a highly secure Enterprise Control Room instance.

Configure application Transport Layer Security

Continue from the Enterprise Control Room installer to the Transport Layer Security (TLS) configuration wizard page. Use this configuration page to generate a self signed certificate on HTTP or import a security certificate to setup a highly secure Enterprise Control Room instance.

If your load balancer uses HTTP to forward traffic to the Enterprise Control Room, do not use the option Enable Force HTTP traffic to HTTPS. We recommend that you use HTTPS to forward the load balancer traffic for enhanced security instead.

1. In the TLS Configuration page, configure the following:

- Generate a Self-Signed Certificate

Enabling the Self-Signed Certificate option allows the installer to generate a unique private key and a self-signed certificate for the Enterprise Control Room.

- Import a Certificate

To import a custom certificate, clear the Self Signed Certificate check box. This setting allows you to import a certificate using the Certificate Path field.



Note: The certificate file must be a PKCS12 format.

Provide the following information:

- Certificate Path: Click the Browse button to import the certificate.
- Private Key Password: Enter the password for the private key.



Attention: Password Limitation: Do not use the at sign (@) in passwords. Using the special character @ in the password causes the certificate file import to fail.

- Webserver Port: Enter the web server port – either HTTP or HTTPS. If the port is already assigned, an error message is displayed.



Attention: The port validation message is also displayed when you add 8080 for the web server and if that port is already in use for a Enterprise Control Room license service. Use a different unassigned port in the above cases.

- Enable Force HTTP traffic to HTTPS: This option redirects all HTTP port requests to HTTPS. To access to the Enterprise Control Room through HTTPS using the generated self-signed certificate, ensure the port numbers are different for HTTP and HTTPS.

To generate a custom certificate for HTTPS, ensure your custom certificate meets the following:

- Create a .pfx certificate with a pass code from a CA trusted authority.
- Combined Root, Intermediate, and Machine level certificates into a single certificate.
- Use the format: [WS Machine Host Name].[DomainName].com for the private key.
- Include the host name as a fully qualified domain name (FQDN) in the certificate. You provide the host name during Enterprise Control Room installation.
- In multi-node HA clusters, issue certificates to the load balancer DNS name.
- Add individual URLs, which require access to all nodes, to the Subject Alternative Name field in the certificate.

2. Click Next to [Configure service credentials](#) on page 334.

Configure service credentials

Continue from the Enterprise Control Room installer to the Service Credentials wizard page. Use the Service Credentials page to specify the account that will be used to run all Windows services that are created by Automation Anywhere installer.

1. In the Service Credentials screen, choose from the listed options.

The Windows Service credentials include a user name and password. The user specified must meet these requirements:

- A member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.

These service credentials are used to create database tables and allow the Enterprise Control Room processes to access the database and repository.

- Local System Account—(default) The logged on user performing the installation.
- Domain Account—Specify a user that is not the local system account user.
 - a. Clear the Local System Account check box.
 - b. Enter the user name and password for the domain account.

Use only supported characters for the user name and password. See [Supported special characters](#) on page 313.

Reasons and requirements for using a domain account user include:

- Do not use the Windows domain credentials
Enter credentials valid for running Automation Anywhere services. Without the valid credentials, the Enterprise Control Room will fail to launch.
- PowerShell script restrictions
Specify a user with permissions to launch PowerShell scripts who is not a Windows domain user. Without the relevant permissions, database table creation can fail.

2. Click Next to configure the [database types and server](#).

Configure database type and server

Continue from the Enterprise Control Room installer to the Database type wizard page. Use this page to configure the Microsoft SQL Server database for use with the Enterprise Control Room.

This procedure applies only to Microsoft Windows Server based installations.



Linux users: See [Installing Enterprise Control Room on Linux - Database configuration](#).

1. Select the Microsoft SQL Server database.
An instance of the SQL Server should be already configured.
2. Click Next.
The Database Server page is displayed (if you selected SQL Server for configuring your database).
3. Set the connection and authentication for the database server.



Note:

- If possible, do not set the value for Database Server as localhost. If you must use localhost, note that the Secure Connection to the database will not work.
 - Click Browse to select the SQL Server instance where the Enterprise Control Room database will be created. Alternatively, enter a database server name or select one from the list.
-

Migration task: If you are migrating from 11.x to Enterprise A2019, browse to the restored 11.x database.

Provide the following details:

- a) Database Port: Use the default port (1433) or specify a custom value.
[Configure default database port](#) on page 336
- b) Use Secure Connection: Select to use a CA certificate as specified.



Note: Use the same host name for certificate and database connections.

- c) Certificate: This option is enabled when you select Use Secure Connection. Browse to select a CA certificate.
[Import HTTPS and CA certificates](#) on page 374

- d) Windows authentication: This option is selected by default and allows connection to the SQL Server using Windows authentication.



Note: If you select Windows authentication, then the user running the installer is used to test that the database exists, create it if required, and grant db_owner to the service account user (NT Authority/System).

- e) SQL Server authentication: Select this option to use SQL Server authentication to connect to the database. Provide the correct user name and password for SQL authentication. Use only supported characters for the user name and password. See [Supported special characters](#) on page 313. Do not use semicolons (;) in the database password.
- f) Name of Control Room database: Enter the name of the Enterprise Control Room database. Migration task: If you are migrating from 11.x to Enterprise A2019, enter the name of the restored database in the database field as shown in the following image:

4. Click Next to provide the Elasticsearch credentials.
[Add Elasticsearch credentials](#) on page 337

Configure default database port

Configure and enable the TCP/IP in the SQL database server to use the default port 1433 when you install the Enterprise Control Room.

Enable TCP/IP from the Microsoft SQL Server Configuration Manager.

1. Ensure the SQL Server Browser service is running in the Task Manager.
2. To set the default port for the SQL database server, launch the Microsoft SQL Server Configuration Manager.
3. Select SQL Server Network Configuration > Protocols for <SQL server instance>.
4. Right-click Protocols for <SQL server instance> and select Open to show the available protocols.
5. Ensure TCP/IP is enabled.
6. Right-click TCP/IP and select Properties.
 You can configure the default port for the SQL database from the TCP/IP Properties window that is displayed.
7. Select the IP Addresses tab to update the default TCP Port to 1433 in the IPAll node.
 If provided, clear the value shown in the TCP Dynamic Ports field.

8. Click OK to confirm and exit the window.
9. Select the SQL Server Services option to Restart the SQL Server <instance name>.
The SQL database server is now configured and enabled to use the default port in the Enterprise Control Room.

Add Elasticsearch credentials

When installing Enterprise A2019, add Elasticsearch credentials for enhanced monitoring and alerting in the Enterprise Control Room.

Based on whether you are performing a new installation, running the setup for the first time to upgrade to a later version, or a subsequent re-installation, the options to add the Elasticsearch credentials or select a backup Elasticsearch server are enabled.

1. In the Provide Elasticsearch Credentials window, enter the credentials for Elasticsearch in the Elasticsearch password field.
This option is enabled only for the master node of the cluster when you run the setup for the first time for an upgrade or a new installation of the Enterprise Control Room. When you enter the password, self-signed certificates are generated for encrypting the data traffic for inter-node and client communication.
The option is disabled for subsequent installations because the password and certificates are retrieved and reused from the second node onwards.
2. Repeat the credentials in the Confirm Elasticsearch password field.
3. Select the Check only if installing on the first node of the backup Elasticsearch cluster check box when you want to install the Enterprise Control Room on the first node that will be used as a backup for the Elasticsearch cluster.
This option is available only if you have provided the Elasticsearch credentials for the master node during a previous installation. The option enables you to use the database backup that is created from the Elasticsearch settings table after the master node of the cluster is installed.
The option is disabled for subsequent installations.
4. Click Next to complete the Enterprise Control Room installation process.
Optionally see the [Setup installation summary](#) on page 337 page.
If you encounter any issues restarting the Automation Anywhere Elastic Search Service, see [Elasticsearch Service fails to start during certificate retrieval process error during A2019.16 upgrade \(A-People login required\)](#).

Setup installation summary

Continue from the Enterprise Control Room installer to the Ready to Install the Program wizard page. From this stage of the installation wizard, you finish the installation wizard and monitor the installation progress.

1. Click Next.
The Ready to Install the Program screen appears.
2. Click Install and allow the installation process to complete.
The InstallShield Wizard Completed screen appears.
3. Click Finish.
Launch Automation Anywhere is enabled by default.

Enable Show installer settings to open the `aae-installsummary.html` file. By default, this is located at `C:\Program Files\Automation Anywhere\Enterprise\`. Use this file to view a summary of the installation.

Complete the Enterprise Control Room configuration and validation.

- [Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

- [Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

- [User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Related tasks

[Installing Enterprise Control Room using Express mode](#) on page 338

Installing Enterprise Control Room using Express mode

Log in to the servers as an Administrator and install Automation Anywhere Enterprise Control Room in Express Mode using the default settings.



Linux users: See [Installing Enterprise Control Room on Linux](#) on page 359.

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file



Attention: This installation mode is ideal for demo and training purposes. This installation mode is not recommended for the production environment.

The Express Mode installation quickly sets up the Enterprise Control Room with default parameters for the various components.

Default parameters

Microsoft SQL Server is the default database for Enterprise Control Room.

The following parameters are installed by default:

Parameter	Default value
SQL database instance	SQLEXPRESS
Authentication type	Windows authentication
Enterprise Control Room database	AAE-Database

Parameter	Default value
Port	1433

To install Automation Anywhere Enterprise Control Room in Express Mode, follow these steps:

1. Log in to the installation server.
2. Start the installer wizard.
 - a) Extract all files from the `AutomationAnywhere_Setup.zip` file.
 - b) Right-click the `AutomationAnywhere.exe` file and select Run as administrator.

The installation process utilizes your SQL database server instance that is used for the Enterprise Control Room and the Bot Insight databases to create a database with the name AAE-Database and configures the database as the default Enterprise Control Room database.

The installation process checks for supported operating system and recommended hardware requirements. The following message appears if the requirements are not met:

This system does not meet all the installation prerequisites for Automation Anywhere Enterprise. Some features might not work as expected after installation. For details, verify the Control Room Installation Prerequisite.

For more information, see [Enterprise A2019 On-Premises prerequisites](#) on page 286.

3. Click Next on the Welcome to the Setup Wizard page.
4. Select one of the following deployment types and click Next:

Deployment type	Description
On-Premises	The Enterprise Control Room, Bots and files are installed on your servers.
Cloud-enabled	All data such as bots and files are installed on your servers. The management functions of the Enterprise Control Room are delivered through Cloud.

5. Accept the licensing agreement and click Next.
6. On the Installation Type page, select the Express option and click Next.

The Database Configuration page appears.

- a) Enter the port you want to use to connect to the database server in the Port field.
The default port is 1433. The installer uses the first available port and checks the availability of each consecutive port.
- b) Select any one of the following options to connect to the database server.

Option	Action
Use Windows Authentication	The system uses your Windows credentials. The Username and Password fields are disabled in the installer.
Sql Server authentication	Enter the Username and Password used for connecting to the database server.



Note: The user who connects to the database server must have database creator privileges.

- c) Enter the name of the database that you want to use for Enterprise Control Room in the Name of Control Room database field.
 - d) Enter the name of the database you want to use for Bot Insight in the Name of Bot Insight database field.
7. Click Next.
 8. On the Ready to Install the Program, click Install and allow the installation process to complete.
 9. On the InstallShield Wizard Completed page, click Finish.
- Launch Automation Anywhere is enabled by default.
- Enable Show installer settings to open the `aae-installsummary.html` file. By default, this is located at `C:\Program Files\Automation Anywhere\Enterprise\`. Use this file to view a summary of the installation.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed. Proceed to [Complete Enterprise Control Room post-installation configuration](#) on page 370.

Related concepts

[Installing Enterprise Control Room using Custom mode](#) on page 330

Log in to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Custom Mode to select installation and configuration options, including installing non-default requirements. Select this mode for a data center deployment.

Installing Enterprise Control Room on Amazon Web Services

Login to an Amazon Web Services (AWS) server instance as Administrator. Then download and start the Enterprise Control Room installer and select Custom mode.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

Step 1: Prepare for installation

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file

Step 2: [Prepare for installation on Amazon Web Services](#) on page 341

Use these steps to prepare the Amazon Web Services (AWS) instances for the Enterprise Control Room installation.

Step 3: [Customize Enterprise Control Room installation on Amazon Web Services](#) on page 343

Install and apply the customized configuration required for the Enterprise Control Room cluster

Step 4: Complete Enterprise Control Room configuration and validation.

on Amazon Web Services (AWS) after completing initial preparations.

[Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

[Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

Step 5: Prepare for users.

[User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Prepare for installation on Amazon Web Services

Use these steps to prepare the Amazon Web Services (AWS) instances for the Enterprise Control Room installation.

If you have not done so already, prepare your AWS Identity and Access Management (IAM) user account to login to the AWS Console.

Do the following:

1. Create AWS Elastic Compute Cloud (EC2) Instances for the Enterprise Control Room Servers.
2. If you use RDS, create Relational Database Service (RDS) Instances for the SQL Server Enterprise 2014 Database server.

3. Configure the AWS Load Balancer.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To prepare AWS instances, do the following:

1. Set up the [Microsoft SQL Server](#) on Amazon Web Services Elastic Compute Cloud (AWS EC2) or Relational Database Service (RDS).
AAE supports both. For a comparison of the two, see [Microsoft SQL Server on AWS](#).
2. Test the database connection with the Microsoft SQL Server.
 - a) Install Microsoft SQL Management Studio on one of the AWS EC2 instances inside the Virtual Private Cloud (VPC).
For more information, see [Download SQL Server Management Studio](#).
 - b) Connect to the Microsoft SQL Server.
For configuration information, see [Working with SQL Servers](#) on page 294.
 - c) (Skip this step if the master database user installs the Enterprise Control Room). Create the following empty database and assign db_owner privileges to the master database user for the AAE-Database database.

3. Set up the shared repository.
 - a) Create an AWS EC2 instance as a Windows File Server with an additional volume of 100 GB.
 - b) Join the Active Directory domain.
 - c) Create a folder and set up the permissions for the repository.
Assign the Enterprise Control Room admin full access to this folder.



Attention: Only the Enterprise Control Room admin is to have full access to this folder because this is the account from which all Enterprise Control Room services run.

4. Launch two AWS instances, one for each Enterprise Control Room server.
 - a) Establish two AWS instances, each with the following configuration:
 - Type: c5.2xlarge or similar instance type (8 CPU, 16 GB RAM)
 - Storage: Root Device: 100 GB
 - Storage: Additional Device: D:\ 200 GB (For Automation Anywhere Install files)
 - Accidental Deletion Prevention: Enabled
 - b) Access the two instances through Remote Desktop Protocol.
 - c) Add the instances to the Active Directory domain.
 - d) For each instance, add the Enterprise Control Room system admin as a local administrator on the computer and reboot the system.
5. Configure the firewall and port.
See [Ports, protocols, and firewall requirements](#) on page 303.
6. Set up the AWS Application Load Balancer.
See [Details for Elastic Load Balancing Products](#).

- Disable the stickiness attribute.
- Set the idle time-out to 120 seconds.

7. Upload the SSL certificate to the Load Balancer.

Continue with [Customize Enterprise Control Room installation on Amazon Web Services](#) on page 343.

Customize Enterprise Control Room installation on Amazon Web Services

Install and apply the customized configuration required for the Enterprise Control Room cluster on Amazon Web Services (AWS) after completing initial preparations.

If you have not done so already, complete the initial installation steps in [Prepare for installation on Amazon Web Services](#) on page 341.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To install the Enterprise Control Room in a cluster setup, do the following steps:

1. Login to the first AWS instance as an Administrator.
2. Download `Automation Anywhere_<version>.exe`.
3. Click Next on the Welcome to the Setup Wizard page.
4. Accept the licensing agreement and click Next.
5. Select the Custom option and click Next.

The Destination Folder page appears. By default, the destination folder is `C:\Program Files\Automation Anywhere\Enterprise\`.

6. To make changes to the destination folder, click Change, enter a new destination folder name, and click OK.



Recommendation: Do not install the application directly in the root directory (`C:\`). You should create a folder, for example, `C:\Program Files\Automation Anywhere\Enterprise\`.

7. Click Next to configure the IP cluster.
8. Select the Enable Cluster Setup check box.

The check box is enabled by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room on a single node and not a cluster, clear the Enable Cluster Setup check box.

9. Enter the IP addresses of the nodes in the cluster.

- a) Use a comma (,) to specify more than one IP address.
For example, to specify three IP addresses in the cluster, enter:
`192.0.2.1,192.0.2.2,192.0.2.3`



Important: The first IP address in the list is used as the master node. Ensure that you enter the IP addresses in the same order on all node configurations in subsequent installations. An incorrect order causes the application to configure the IP addresses as separate clusters, which will result in data loss when the issue is fixed after installation.

You can install multiple nodes at the same time after the master node is initially installed.

After installation, you can add a new IP address to the cluster at the end of the list.

- b) After you enter the cluster IP addresses correctly, select a valid address IP at the message prompt to provide network access to the machine.

10. Click Next to configure the application Transport Layer Security (TLS).

11. In the TLS Configuration page, configure the following:

- Generate a Self-Signed Certificate

Enabling the Self-Signed Certificate option allows the installer to generate a unique private key and a self-signed certificate for the Enterprise Control Room.

- Import a Certificate

To import a custom certificate, clear the Self Signed Certificate check box. This setting allows you to import a certificate using the Certificate Path field.



Note: The certificate file must be a PKCS12 format.

Provide the following information:

- Certificate Path: Click the Browse button to import the certificate.
- Private Key Password: Enter the password for the private key.



Attention: Password Limitation: Do not use the at sign (@) in passwords. Using the special character @ in the password causes the certificate file import to fail.

- Webserver Port: Enter the web server port – either HTTP or HTTPS. If the port is already assigned, an error message is displayed.



Attention: The port validation message is also displayed when you add 8080 for the web server and if that port is already in use for a Enterprise Control Room license service. Use a different unassigned port in the above cases.

- Enable Force HTTP traffic to HTTPS: This option redirects all HTTP port requests to HTTPS. To access to the Enterprise Control Room through HTTPS using the generated self-signed certificate, ensure the port numbers are different for HTTP and HTTPS.

To generate a custom certificate for HTTPS, ensure your custom certificate meets the following:

- Create a .pfx certificate with a pass code from a CA trusted authority.
- Combined Root, Intermediate, and Machine level certificates into a single certificate.
- Use the format: [WS Machine Host Name].[DomainName].com for the private key.
- Include the host name as a fully qualified domain name (FQDN) in the certificate. You provide the host name during Enterprise Control Room installation.
- In multi-node HA clusters, issue certificates to the load balancer DNS name.
- Add individual URLs, which require access to all nodes, to the Subject Alternative Name field in the certificate.

12. Click Next to configure the service credentials.

13. In the Service Credentials screen, choose from the listed options.

The Windows Service credentials include a user name and password. The user specified must meet these requirements:

- A member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.

These service credentials are used to create database tables and allow the Enterprise Control Room processes to access the database and repository.

- Local System Account—(default) The logged on user performing the installation.
- Domain Account—Specify a user that is not the local system account user.
 - a. Clear the Local System Account check box.
 - b. Enter the user name and password for the domain account.
Use only supported characters for the user name and password. See [Supported special characters](#) on page 313.

Reasons and requirements for using a domain account user include:

- Do not use the Windows domain credentials
Enter credentials valid for running Automation Anywhere services. Without the valid credentials, the Enterprise Control Room will fail to launch.
- PowerShell script restrictions
Specify a user with permissions to launch PowerShell scripts who is not a Windows domain user. Without the relevant permissions, database table creation can fail.

14. Add the SQL Server and click Next.
Select Microsoft SQL Server, type the Name, and click Next.
15. On the InstallShield Wizard Completed page, click Finish.
Launch Automation Anywhere is enabled by default.
Enable Show installer settings to open the `aae-installsummary.html` file. By default, this is located at `C:\Program Files\Automation Anywhere\Enterprise\`. Use this file to view a summary of the installation.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page shown. Continue with [Configure settings post-installation on Amazon Web Services](#) on page 345.

Configure settings post-installation on Amazon Web Services

After installation is complete, configure Enterprise Control Room settings on Amazon Web Services.

If you have not done so already, complete the installation steps in [Customize Enterprise Control Room installation on Amazon Web Services](#) on page 343.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To install Automation Anywhere on Amazon Web Services (AWS), do the following steps:

1. Configure the following Enterprise Control Room settings:
 - a) Specify the host name URL by providing the AWS Load Balancer URL.
This is the URL that users use to access your installation of Enterprise Control Room.
 - b) Select the Active Directory authentication type. For more information, see [Configure Enterprise Control Room for Active Directory: manual mode](#) on page 379.

2. After you configure the Enterprise Control Room, install product licenses.
 3. Test Enterprise Control Room access using the AWS Load Balancer URL.
- This completes the Enterprise Control Room installation on AWS.

Complete the Enterprise Control Room configuration and validation.

- [Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

- [Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

- [User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Installing Enterprise Control Room on Microsoft Azure

Installing Enterprise Control Room on Microsoft Azure begins in the Azure environment and ends with configurations in the Enterprise Control Room.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

Step 1: Prepare for installation.

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file

Step 2: [Verify readiness for installation on Microsoft Azure](#) on page 347

Use these steps to configure third-party products for the Enterprise Control Room installation.

Step 3: [Begin Enterprise Control Room installation on Microsoft Azure](#) on page 349

Initial steps for Enterprise Control Room installation on Microsoft Azure.

Step 4: [Customize Enterprise Control Room installation on Microsoft Azure](#) on page 350

Install and apply the customized configuration required for the Enterprise Control Room cluster on Microsoft Azure.

Step 5: Complete Enterprise Control Room configuration and validation.

[Complete Enterprise Control Room post-installation](#)

After installing the Enterprise Control Room, complete the configuration settings

[configuration](#) on page 370 to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

[Post-installation user management](#) on page 377 After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

Step 6: Prepare for users.

[User management](#) on page 1104 As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Verify readiness for installation on Microsoft Azure

Use these steps to configure third-party products for the Enterprise Control Room installation.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To configure third-party products prior to installation, do the following steps:

1. Ensure the installation environment meets the data center requirements and collect the necessary information about the following components:
 - Load balancer - IP address
 - Microsoft SQL Server - port credentials
 - Azure SMB file share - address credentials
 - Enterprise identity management system (optional)

If you have Active Directory (AD) - AD server domain credentials

 - SMTP - host port HTTP/S ports for TLS (optional)

- Enterprise Control Room servers - Have Windows credential manager installed

Refer to [Supported data center component versions on Microsoft Azure](#) on page 349 for configuration and version information.

- Configure the Network Security Group as per the recommended security policies for Inbound Port rules:

Data center object	Port	Protocol
Enterprise Control Room	80 443	Any
LDAP	3268 3269	Any
email SMTP	587	Any
SSH	22	Any
RDP	3389	TCP

- Configure the AD server.

Ensure all users are part of the AD domain and the AD server is setup in IaaS mode for Azure cluster environment installations. To add user, navigate to Active Directory Users and Computers > <domain> > Users and add the necessary user.

To configure the AD server on Azure with IDaaS, refer to the [Microsoft Azure documentation](#).

- Ensure the Enterprise Control Room servers in the cluster can ping each other.

If the ping is not successful:

- Enable the following below file and printer sharing firewall rule:

```
File and Printer Sharing (Echo Request - ICMPv4-In) File and Printer
Sharing All Yes Allow No Any Any Any ICMPv4
```

- Ping the Enterprise Control Room after enabling the firewall rule change.

When you have completed the pre-installation configurations, [Begin Enterprise Control Room installation on Microsoft Azure](#) on page 349.

Supported data center component versions on Microsoft Azure

The supported operating system versions for installing Automation Anywhere A2019 on the Microsoft Azure cluster environment are identified for each component.

Data center object	Supported version	Configuration
Enterprise Control Room operating system	- Microsoft Windows Server 2012 and 2012 R2 Datacenter - Microsoft Windows Server 2016 Standard and Datacenter - Microsoft Windows Server 2019 Standard and Datacenter	IaaS
Identity management: Azure Active Directory	Azure Active Directory	- IDaaS - Windows 2016 for IaaS
SMB File Share	Azure File Share	PaaS
Load Balancer	Azure Load Balancer (Not Application Gateway)	PaaS
Microsoft SQL Server	Azure SQL Database with single database (Microsoft SQL Azure (RTM) - 12.0.2000.8)	PaaS

Begin Enterprise Control Room installation on Microsoft Azure

Initial steps for Enterprise Control Room installation on Microsoft Azure.

If you have not done so already, complete the pre-installation configuration in [Verify readiness for installation on Microsoft Azure](#) on page 347.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To begin the installation:

1. Use Remote Desktop Connection (RDC) to connect to the Enterprise Control Room server, as an Administrator, and run the Enterprise Control Room installer.
2. Click Yes to start the installer.
3. Click Next on the Welcome to the Setup Wizard page.
4. Accept the licensing agreement and click Next.
5. Select the Custom option and click Next.
6. Click Next to setup the system IPs.
The Cluster Configuration window displays.

Continue with [Customize Enterprise Control Room installation on Microsoft Azure](#) on page 350.

Customize Enterprise Control Room installation on Microsoft Azure

Install and apply the customized configuration required for the Enterprise Control Room cluster on Microsoft Azure.

If you have not done so already, complete the initial installation steps in [Begin Enterprise Control Room installation on Microsoft Azure](#) on page 349. This task requires the configuration information you gathered in the prerequisites stage. This includes IP addresses, certificates, and credentials for the Enterprise Control Room servers, datacenter servers, and databases.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To install the Enterprise Control Room in a cluster setup, do the following steps:

1. Select the Enable Cluster Setup check box.

The check box is enabled by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room on a single node and not a cluster, clear the Enable Cluster Setup check box.

2. Enter the IP addresses of the nodes in the cluster.

- a) Use a comma (,) to specify more than one IP address.

For example, to specify three IP addresses in the cluster, enter:

192.0.2.1,192.0.2.2,192.0.2.3



Important: The first IP address in the list is used as the master node. Ensure that you enter the IP addresses in the same order on all node configurations in subsequent installations. An incorrect order causes the application to configure the IP addresses as separate clusters, which will result in data loss when the issue is fixed after installation.

You can install multiple nodes at the same time after the master node is initially installed.

After installation, you can add a new IP address to the cluster at the end of the list.

- b) After you enter the cluster IP addresses correctly, select a valid address IP at the message prompt to provide network access to the machine.

3. Click Next to configure the application Transport Layer Security (TLS).

4. In the TLS Configuration page, configure the following:

- Generate a Self-Signed Certificate

Enabling the Self-Signed Certificate option allows the installer to generate a unique private key and a self-signed certificate for the Enterprise Control Room.

- Import a Certificate

To import a custom certificate, clear the Self Signed Certificate check box. This setting allows you to import a certificate using the Certificate Path field.



Note: The certificate file must be a PKCS12 format.

Provide the following information:

- Certificate Path: Click the Browse button to import the certificate.
- Private Key Password: Enter the password for the private key.



Attention: Password Limitation: Do not use the at sign (@) in passwords. Using the special character @ in the password causes the certificate file import to fail.

- Webserver Port: Enter the web server port – either HTTP or HTTPS. If the port is already assigned, an error message is displayed.



Attention: The port validation message is also displayed when you add 8080 for the web server and if that port is already in use for a Enterprise Control Room license service. Use a different unassigned port in the above cases.

- Enable Force HTTP traffic to HTTPS: This option redirects all HTTP port requests to HTTPS. To access to the Enterprise Control Room through HTTPS using the generated self-signed certificate, ensure the port numbers are different for HTTP and HTTPS.

To generate a custom certificate for HTTPS, ensure your custom certificate meets the following:

- Create a .pfx certificate with a pass code from a CA trusted authority.
- Combined Root, Intermediate, and Machine level certificates into a single certificate.
- Use the format: [WS Machine Host Name].[DomainName].com for the private key.
- Include the host name as a fully qualified domain name (FQDN) in the certificate. You provide the host name during Enterprise Control Room installation.
- In multi-node HA clusters, issue certificates to the load balancer DNS name.
- Add individual URLs, which require access to all nodes, to the Subject Alternative Name field in the certificate.

5. Click Next to configure the service credentials.

6. In the Service Credentials screen, choose from the listed options.

The Windows Service credentials include a user name and password. The user specified must meet these requirements:

- A member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.

These service credentials are used to create database tables and allow the Enterprise Control Room processes to access the database and repository.

- Local System Account—(default) The logged on user performing the installation.
- Domain Account—Specify a user that is not the local system account user.

a. Clear the Local System Account check box.

b. Enter the user name and password for the domain account.

Use only supported characters for the user name and password. See [Supported special characters](#) on page 313.

Reasons and requirements for using a domain account user include:

- Do not use the Windows domain credentials

Enter credentials valid for running Automation Anywhere services. Without the valid credentials, the Enterprise Control Room will fail to launch.

- PowerShell script restrictions

Specify a user with permissions to launch PowerShell scripts who is not a Windows domain user. Without the relevant permissions, database table creation can fail.

7. Click Next to configure database type and server.
8. Set the connection and authentication for the database server.



Note:

- If possible, do not set the value for Database Server as localhost. If you must use localhost, note that the Secure Connection to the database will not work.
- Click Browse to select the SQL Server instance where the Enterprise Control Room database will be created. Alternatively, enter a database server name or select one from the list.

Migration task: If you are migrating from 11.x to Enterprise A2019, browse to the restored 11.x database.

Provide the following details:

- a) Database Port: Use the default port (1433) or specify a custom value.

[Configure default database port](#) on page 336

- b) Use Secure Connection: Select to use a CA certificate as specified.



Note: Use the same host name for certificate and database connections.

- c) Certificate: This option is enabled when you select Use Secure Connection. Browse to select a CA certificate.

[Import HTTPS and CA certificates](#) on page 374

- d) Windows authentication: This option is selected by default and allows connection to the SQL Server using Windows authentication.



Note: If you select Windows authentication, then the user running the installer is used to test that the database exists, create it if required, and grant db_owner to the service account user (NT Authority/System).

- e) SQL Server authentication: Select this option to use SQL Server authentication to connect to the database. Provide the correct user name and password for SQL authentication.

Use only supported characters for the user name and password. See [Supported special characters](#) on page 313. Do not use semicolons (;) in the database password.

- f) Name of Control Room database: Enter the name of the Enterprise Control Room database.

Migration task: If you are migrating from 11.x to Enterprise A2019, enter the name of the restored database in the database field as shown in the following image:

9. Click Next.
 10. On the Ready to Install the Program, click Install and allow the installation process to complete.
 11. On the InstallShield Wizard Completed page, click Finish.
- Launch Automation Anywhere is enabled by default.
- Enable Show installer settings to open the `aae-installsummary.html` file. By default, this is located at `C:\Program Files\Automation Anywhere\Enterprise\`. Use this file to view a summary of the installation.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page shown. Continue with [Configure settings post-installation on Microsoft Azure](#) on page 353.

Configure settings post-installation on Microsoft Azure

After Enterprise Control Room installation is complete, use the Microsoft Azure Portal to configure the clusters. Use the Azure Portal to configure Windows credentials, Enterprise Control Room settings for repository and URL, master key for Credential Vault, Active Directory authentication, and optionally SMTP settings.

If you have not done so already, complete the installation steps in [Customize Enterprise Control Room installation on Microsoft Azure](#) on page 350.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

1. From the Azure Portal where [SMB File Share](#) is setup, get the Connection String to retrieve following parameters:
 - Internet or network address
 - User name
 - Password
2. Locate the Window Credential Manager on the control room server and click Add a Windows Credential.
3. Enter the credential information.



Note: Adding a user under Windows Credential Manager needs to be repeated on all the servers used for testing in the cluster environment (Enterprise Control Room, Clients/ Devices).

4. Enter information and click Save and Continue.
Repository path is extracted from SMB File Share and Enterprise Control Room access URL in is a load balancer Public IP.
5. Copy the Master Key and save it (it will be needed to restart the services).
6. Select Express mode and click Save and Continue.
7. Enter the Active Directory authentication configuration information, including URL, Domain username, and password, then click Check Connection. If settings are correct, click Next.
8. Enter the AD user created previously and click Check name in Active Directory. Upon validation, click Save and Log in.
Create additional users as needed and create corresponding users in the Enterprise Control Room.
9. Optional: Continue with installing other control room nodes in the cluster.
10. Perform the SMTP registration.



Note: A real SSL certificate is recommended for use with deployments.

This completes the Enterprise Control Room installation on Microsoft Azure.

Complete the Enterprise Control Room configuration and validation.

- [Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

- [Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

- [User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Installing Enterprise Control Room on Google Cloud Platform

Log in to a Google Cloud Platform (GCP) server instance as administrator. Then download and start the Enterprise Control Room installer and install in Custom mode.



Note: There are many possible system configurations and requirements. These installation steps do not account for all those possibilities so your specific setup and installation steps will vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

1. Complete the prerequisites for installation:
 - Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
 - Ensure that you have the following:

- Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file
2. [Prepare to install Enterprise Control Room on Google Cloud Platform](#) on page 355
Ensure that you complete the required steps to prepare the Google Cloud Platform instances for installing the Enterprise Control Room.
 3. [Perform custom installation of Enterprise Control Room on Google Cloud Platform](#) on page 356
Install and apply the customized configuration required for the Enterprise Control Room cluster on Google Cloud Platform after completing initial preparations.
 4. [Configure Google Cloud Platform settings after installation](#) on page 359
After installing the Enterprise Control Room, configure the required settings on Google Cloud Platform.
 5. Complete the Enterprise Control Room configuration and validation.
 - a) [Complete Enterprise Control Room post-installation configuration](#) on page 370
After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.
 - b) [Post-installation user management](#) on page 377
After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.
 6. [Manage your users](#)
As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Prepare to install Enterprise Control Room on Google Cloud Platform

Ensure that you complete the required steps to prepare the Google Cloud Platform instances for installing the Enterprise Control Room.

1. Configure the Network Security Group of all the servers as specified in the following list:
 - Name: aarestrictedsecuritygroup
 - Type: Ingress
 - Targets: aarestrictedsecuritygroup
 - Filters: IP ranges: List of IP addresses provided by the IT security team
 - Protocols and ports: all
 - Action: Allow
 - Priority: 1000
 - Network: default



Note: In the IP address ranges field, enter all the IP addresses of all the virtual machines (VMs) in the cluster environment.

2. Set up the F5 load balancer with the following configurations:
 - Select standard as the type option.
 - Enter 0.0.0.0/0 as the Source address in Host.

- Enter `F5-LB-Private IP` as the Destination Address/Mask in Host.
- Enter 80 as the Port and select HTTP as the Service Port.
- Select the Notify Status to Virtual Address check box.
- Enable the load balancer state.

To use SSL offload with the F5 load balancer, provide the SSL certificate at the load balancer level, and configure your Enterprise Control Room application servers to use HTTP mode only.



Recommendation: Your IT team should configure the F5 load balancer with the Enterprise Control Room.

3. Set up pools and nodes with the following configurations:

- Update the pool properties:
 - Choose a basic configuration.
 - Select ICMP as your gateway to monitor health.
- Update the pool member options:
 - Choose the round-robin method for load balancing.
 - Disable the priority group activation.
- Update the node properties:
 - Change the state to enabled.
 - Select node-specific health monitors.
 - Select ICMP as your gateway to monitor health.

4. Configure the Active Directory server.

Verify that all the VMs in the cluster can ping each other using private IP addresses.

5. Connect using RDP to one of the Enterprise Control Room nodes or servers and run the Enterprise Control Room installer.

The Installation Prerequisite Check verifies that your system has the basic configurations required for Automation Anywhere. See [Enterprise A2019 On-Premises prerequisites](#) on page 286.

[Perform custom installation of Enterprise Control Room on Google Cloud Platform](#) on page 356

Perform custom installation of Enterprise Control Room on Google Cloud Platform

Install and apply the customized configuration required for the Enterprise Control Room cluster on Google Cloud Platform after completing initial preparations.

If you have not done so already, complete the initial installation steps: [Prepare to install Enterprise Control Room on Google Cloud Platform](#) on page 355.

1. Log in to the first Google Cloud Platform instance as an administrator.
2. Download the `Automation Anywhere__<version>.exe` file.
[A-People Downloads page \(Login required\)](#)
3. Run the installer file.
4. Click Next on the Welcome to the Setup Wizard page.
5. Accept the licensing agreement and click Next.
6. Select the Custom option and click Next.

The Destination Folder page appears. By default, the destination folder is `C:\Program Files\Automation Anywhere\Enterprise\`.

7. To make changes to the destination folder, click Change, enter a new destination folder name, and click OK.



Recommendation: Do not install the application directly in the root directory (`C:\`). You should create a folder, for example, `C:\Program Files\Automation Anywhere\Enterprise\`.

8. Click Next to configure the IP cluster.
9. Select the Enable Cluster Setup check box.

The check box is enabled by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room on a single node and not a cluster, clear the Enable Cluster Setup check box.

10. Enter the IP addresses of the nodes in the cluster.
 - a) Use a comma (,) to specify more than one IP address.
For example, to specify three IP addresses in the cluster, enter:
`192.0.2.1,192.0.2.2,192.0.2.3`



Important: The first IP address in the list is used as the master node. Ensure that you enter the IP addresses in the same order on all node configurations in subsequent installations. An incorrect order causes the application to configure the IP addresses as separate clusters, which will result in data loss when the issue is fixed after installation.

You can install multiple nodes at the same time after the master node is initially installed.

After installation, you can add a new IP address to the cluster at the end of the list.

- b) After you enter the cluster IP addresses correctly, select a valid address IP at the message prompt to provide network access to the machine.
11. Click Next to configure the application Transport Layer Security (TLS).
12. In the TLS Configuration page, configure the following:
 - Generate a Self-Signed Certificate
Enabling the Self-Signed Certificate option allows the installer to generate a unique private key and a self-signed certificate for the Enterprise Control Room.
 - Import a Certificate
To import a custom certificate, clear the Self Signed Certificate check box. This setting allows you to import a certificate using the Certificate Path field.



Note: The certificate file must be a PKCS12 format.

Provide the following information:

- Certificate Path: Click the Browse button to import the certificate.
- Private Key Password: Enter the password for the private key.



Attention: Password Limitation: Do not use the at sign (@) in passwords. Using the special character @ in the password causes the certificate file import to fail.

- Webserver Port: Enter the web server port – either HTTP or HTTPS. If the port is already assigned, an error message is displayed.



Attention: The port validation message is also displayed when you add 8080 for the web server and if that port is already in use for a Enterprise Control Room license service. Use a different unassigned port in the above cases.

- Enable Force HTTP traffic to HTTPS: This option redirects all HTTP port requests to HTTPS. To access to the Enterprise Control Room through HTTPS using the generated self-signed certificate, ensure the port numbers are different for HTTP and HTTPS.

To generate a custom certificate for HTTPS, ensure your custom certificate meets the following:

- Create a .pfx certificate with a pass code from a CA trusted authority.
- Combined Root, Intermediate, and Machine level certificates into a single certificate.
- Use the format: [WS Machine Host Name].[DomainName].com for the private key.
- Include the host name as a fully qualified domain name (FQDN) in the certificate. You provide the host name during Enterprise Control Room installation.
- In multi-node HA clusters, issue certificates to the load balancer DNS name.
- Add individual URLs, which require access to all nodes, to the Subject Alternative Name field in the certificate.

13. Click Next to configure the service credentials.

14. In the Service Credentials screen, choose from the listed options.

The Windows Service credentials include a user name and password. The user specified must meet these requirements:

- A member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.

These service credentials are used to create database tables and allow the Enterprise Control Room processes to access the database and repository.

- Local System Account—(default) The logged on user performing the installation.
- Domain Account—Specify a user that is not the local system account user.

a. Clear the Local System Account check box.

b. Enter the user name and password for the domain account.

Use only supported characters for the user name and password. See [Supported special characters](#) on page 313.

Reasons and requirements for using a domain account user include:

- Do not use the Windows domain credentials

Enter credentials valid for running Automation Anywhere services. Without the valid credentials, the Enterprise Control Room will fail to launch.

- PowerShell script restrictions

Specify a user with permissions to launch PowerShell scripts who is not a Windows domain user. Without the relevant permissions, database table creation can fail.

15. Add the SQL Server and click Next.

Select Microsoft SQL Server, enter the name, and click Next.

16. On the InstallShield Wizard Completed page, click Finish.

Launch Automation Anywhere is enabled by default.

Enable Show installer settings to open the `aae-installsummary.html` file. By default, this is located at `C:\Program Files\Automation Anywhere\Enterprise\`. Use this file to view a summary of the installation.

The Enterprise Control Room is opened in your default browser and displays the Configure Enterprise Control Room settings page.

[Configure Google Cloud Platform settings after installation](#) on page 359

Configure Google Cloud Platform settings after installation

After installing the Enterprise Control Room, configure the required settings on Google Cloud Platform.

If you have not done so already, complete the installation steps: [Perform custom installation of Enterprise Control Room on Google Cloud Platform](#) on page 356.

1. Configure the following Enterprise Control Room settings:
 - a) Specify the host name URL by providing the Google Cloud Platform load balancer URL.
This is the URL that users use to access the Enterprise Control Room.
 - b) Select the Active Directory authentication type.
See [Configure Enterprise Control Room for Active Directory: manual mode](#) on page 379.
2. After you configure the Enterprise Control Room, install product licenses.
3. Test access to the Enterprise Control Room using the Google Cloud Platform load balancer URL.

Complete the Enterprise Control Room configuration and validation.

- [Complete Enterprise Control Room post-installation configuration](#) on page 370
After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.
- [Post-installation user management](#) on page 377
After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.
- [User management](#) on page 1104
As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Installing Enterprise Control Room on Linux

You start installing the Automation Anywhere Enterprise Control Room in the Linux environment and complete the installation in the Enterprise Control Room.



Note: The installation steps do not list any specific configurations or requirements and therefore your setup might be different. Automation Anywhere does not provide any warranties that the installation steps conform with your system configurations or requirements.

This task applies to first-time installation and Enterprise A2019 On-Premises updates.

To perform an unattended installation, see [Performing silent installation of Enterprise Control Room on Linux](#) on page 362.

To remove Enterprise Control Room, see [Uninstall Enterprise A2019 On-Premises from Linux server](#) on page 365.

Ensure the following:

- The Microsoft SQL Server database is installed and running.
- The Enterprise A2019 installation server is connected to the Microsoft SQL Server database.

1. Verify the installation prerequisites.

- Verify the [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Verify the Microsoft SQL Server is running, and execute the command:

```
$ sudo systemctl status mssql-server
```

If Microsoft SQL Server is not running, install it.



Note: The Microsoft SQL Server installation instructions refer to Red Hat Enterprise Linux version 8. For version 7, change the paths to `/rhel/7` instead of `/rhel/8`.

See [Quickstart: Install SQL Server](#).

- Ensure the following files are available:

- SSL certificate
- License file

- Download the `AutomationAnywhereEnterprise_A2019_<linux-version>_<build>.bin` installation file to the Linux server from [A-People Downloads page \(Login required\)](#)

- Verify that the installation server has internet access in order to update Linux kernel files and OS libraries using Yum updates.

Alternatively, configure `/etc/yum.conf` on the installation server to use a repository local to its network. The repository should be up to date before starting the installation.

- Starting in Enterprise A2019 Build 6463, Python 3.6 is required.

2. Log in to the installation server.

3. Run the installer command as a superuser from the Linux shell:

- ```
$ sudo chmod +x AutomationAnywhereEnterprise_A2019_<linux-version>_<build>.bin
```

- ```
$ sudo ./AutomationAnywhereEnterprise_A2019_<linux-version>_<build>.bin
```

The installation wizard verifies the installation requirements and proceeds with the installation.



Tip:

- Enter the `back` command to return to a previous command step.
- Press the return key to accept default values, or enter an alternate value and then press the return key.

4. To accept the license agreement, enter `Y`.

5. In the Transport Layer Security (TLS) screen, configure the following:

- Control Room HTTP Port (Default: 80)

- b) Control Room HTTPS Port (Default: 443)
- c) To enable the Self Signed Certificate, enter 1 or enter 2 to disable it.
- d) To Force HTTP Traffic to HTTPS, enter 1 to disable it or enter 2 to enable it.

[Configure application Transport Layer Security](#) on page 333

6. In the Cluster Configuration screen, enter 1 to disable it or enter 2 to enable it.
 - If you choose to enable cluster configuration, enter the IP addresses of the cluster nodes. Use a comma (,) to specify more than one IP address. Do not add space between IP addresses. For example: 192.161.1.1,192.161.1.2
 - The repository location should be a shared location accessible from all Enterprise Control Room nodes in the cluster.
 - If multiple local IP addresses are configured on the machine, select the IP address on which the Enterprise Control Room is installed.

[Configure IP cluster](#) on page 332

7. In the Database Configuration screen, configure the following:
 - a) Database Server address (default: localhost)
 - b) Database port (default: 1433)
 - c) Control Room Database (default: AAE-Database) or enter a name.
 - d) SQL Server Login credentials: provide the login ID and SQL Server password.
8. Review the pre-installation summary.
9. Press Enter to install the Automation Anywhere Enterprise in the default directory:
/opt/automationanywhere/enterprise
A message appears stating the installation is successfully completed. See [Installed Enterprise Control Room directories and files](#) on page 390 for the location of control room assets.
10. Configure the post-installation settings.
[Configuring post-installation settings](#) on page 371
11. Verify A2019 services started successfully.
[Stop and start Enterprise Control Room services on Linux](#) on page 1146
12. Set up Enterprise Control Room access.
[Configure Enterprise Control Room database](#) on page 384
13. Set up licenses.
[Installing additional licenses](#) on page 1145

After the Enterprise Control Room installation and configuration is complete, users can register their devices to create and run bots.

[Install Bot agent and register device](#) on page 400

Related reference

[Installing Enterprise Control Room On-Premises](#) on page 284

Review the installation core tasks and topics for installing A2019 Enterprise Control Room in a data center on an On-Premises server or a cloud service provider server instance.

Performing silent installation of Enterprise Control Room on Linux

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized script with parameters specific to your business requirements. The entire installation process runs in the background without requiring user interaction or displaying messages.

- Verify you have completed the [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file
- Verify the installation server has internet access in order to update Linux kernel files and OS libraries using Yum updates. Alternatively, configure `/etc/yum.conf` on the installation server to use a repository local to its network. The repository should be up to date before starting the installation.

Two scripts run the Linux silent installation:

- `LinuxInstaller.sh`: This script contains the installation parameters you want to apply during installation.
- `CallLinuxScript.sh`: This script executes the first script.

See the installation parameters and sample scripts.

Run the script in Linux shell.

1. Review the parameters and identify the settings you require.

Enterprise Control Room installation parameters		
Installation parameter	Description	Script response options
Proceed with Installation	The installer analyzes your system and notifies you if it does not meet the prerequisites. In silent mode, set the value to 1.	1 = Continue 2 = Cancel
Continue setup wizard	The installer displays an introduction and offers options of <code>back</code> to return to a previous step and <code>quit</code> to cancel the installation. Default is <code>Enter</code> .	<code>\n</code>
Advance to end of License Agreement	In console mode, you have the option to page through the license agreement. In silent mode, you advance to the end by selecting 0.	0
Accept License Agreement	Accept the license agreement to continue with the installation. In silent mode, set the value to Y.	Y = Yes N = No

Enterprise Control Room installation parameters		
Installation parameter	Description	Script response options
Enterprise Control Room HTTP Port	The web server port you will use to access the Enterprise Control Room with HTTP. The default value is 80. Replace the number 80 in the sample script to use a different port.	80 = Default port yy = your port number yy
Enterprise Control Room HTTPS Port	The web server port you will use to access the Enterprise Control Room with HTTPS. The default value is 443. Replace the number 443 in the sample script to use a different port.	443 = Default port zzz = your port number zzz
TLS configuration: Self-Signed Certificate	Choose to enable or disable the self-signed certificate. The default is Enable, or 1.	1 = Default (Enable) 2 = Disable
TLS Configuration: Force HTTP traffic to HTTPS	Choose to disable or enable forcing traffic from HTTP to HTTPS. The default is Disable.	1 = Default (Disable) 2 = Enable
Cluster setup	Choose to disable or enable clustering. The default is Disable.	1 = Default (Disable) 2 = Enable
Database server URL	server1.yourcompany.com	Enter the URL of the server where the database resides.
Database server port	Default is 1433	1433
Database name	Default is localhost	Default is localhost. If database is on a separate server, enter the host name.
Database SA user name	Database system administrator login ID	Default is sa.
Database SA user password	Database system administrator login ID	The password to log in to your database as system administrator user.
Database Secure Connection	Choose to disable or enable the connection. Default is Disable (1).	1 = Default (Disable) 2 = Enable
Pre-Installation summary	If the output is directed to a console, the installer will show a summary of features selected and whether the prerequisites are met. Default is Enter	\n

Enterprise Control Room installation parameters		
Installation parameter	Description	Script response options
Proceed	Confirm to proceed with the installation. Default is Enter.	\n

2. Create the script `LinuxInstaller.sh`, substituting values for your own environment.



Warning: Be sure to test the connection to the SQL Server and enter verified values for database name, database administrator login ID, database administrator password. Invalid values cause the script to stall and fail.

Example script:

```
echo "Starting Installation"
#Change the next two lines to match the install filename you downloaded
sudo chmod a+x AutomationAnywhereEnterprise_A2019_el7_4799.bin
sudo ./AutomationAnywhereEnterprise_A2019_el7_4799.bin << EOF
1
\n
0
Y
80
443
1
1
1
#Change the next line to your Automation Anywhere install server
mybotserver.mycompany.com
1433
#Replace next line with your database name
AAE-Database
#Change the next two lines to your SQL Server admin ID and password
admin
youradminpasswordhere
1
\n
\n
\n
EOF
```

3. Create the script `CallLinuxscript.sh` to execute `Linuxinstaller.sh`.
This script writes the installation results to `/home/Installlog`. Change the path to the install log file, if required.

```
echo "Starting Linux installation"
sudo ./LinuxInstaller.sh >> /home/Installlog
echo "Installation Completed Successfully"
```

4. On the installation server, logged in as an Administrator, execute the scripts.
 - a) `$ sudo chmod a+x LinuxInstaller.sh`
 - b) `$ sudo chmod a+x CallLinuxscript.sh`
 - c) `$ sudo ./CallLinuxscript.sh`
5. Review the installation log to confirm there were no errors.



Note: The Enterprise Control Room installation folder on Linux is located by default at /opt/automationanywhere/enterprise.

Continue from the step Configure the post-installation settings in

[Installing Enterprise Control Room on Linux](#) on page 359.

Uninstall Enterprise A2019 On-Premises from Linux server

Uninstall the On-Premises Enterprise Control Room from your Linux server.

Ensure that the Enterprise A2019 installation server is disconnected from the Microsoft SQL Server database.

1. Log in to the installation server.
2. Run the uninstaller command as a superuser:

```
$ sudo /opt/automationanywhere/enterprise/_Automation\ Anywhere\
Enterprise_installation/Change\ Automation\ Anywhere\ Enterprise\
Installation
```

The installation wizard verifies the installation and proceeds with the uninstallation.



Tip:

- Enter the back command to return to a previous command step.
- Press the return key to accept default values, or enter an alternate value then press the return key.

3. Confirm the uninstallation by entering Y.
 The Automation Anywhere Enterprise components are removed from the Linux system.
 The databases with associated Automation Anywhere Enterprise information about users and bots remains stored in the database and remain connected to any other Enterprise Control Room in your cluster.

Performing silent uninstallation of Enterprise Control Room on Linux

Use the sample script to perform an unattended uninstallation of Enterprise Control Room.

Ensure that the Enterprise A2019 installation server is disconnected from the Microsoft SQL Server database.

1. Log in to the installation server.
2. Create a shell script named `LinuxUninstall.sh` that will run the uninstallation process and automatically respond to prompts:

```
sudo /opt/automationanywhere/enterprise/_Automation\ Anywhere\
Enterprise_installation/Change\ Automation\ Anywhere\ Enterprise\
Installation << EOF
\n
1
\n
EOF
```

3. Mark the script as executable and run the uninstallation process.
 a) `$ sudo chmod a+x LinuxUninstall.sh`

b) `$ sudo ./LinuxUninstall.sh`

The script is executed:

```
=====
Automation Anywhere Enterprise                      (created with
InstallAnywhere)
-----
Preparing CONSOLE Mode Uninstallation...

=====
Uninstall Automation Anywhere Enterprise
-----

About to uninstall...
```

4. When the uninstallation is complete, manually remove any remaining files.

Installing Enterprise Control Room on Microsoft Windows Server using scripts

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized script for a full setup or the command line for a hot fix patch. Silent install runs the entire installation process in the background without requiring user interaction or displaying messages.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task.

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file

Create a Powershell script. Refer to the installation parameters and sample scripts. Run the script in Powershell.

1. Review the parameters and identify the settings you require.

Enterprise Control Room installation parameters

Variable Name	Description
AA_CRCLUSTERCONFIG	if AA_SETCLUSTERMODE=1 then cluster IP comma separated
AA_CRDBPORT	Enterprise Control Room database port. Default value is 1433
AA_CRDBSSLMODE	Secure SQL Connection
AA_CRFORCEHTTPSCONFIG=" "	-

Variable Name	Description
AA_CRFORCETOHTTPS="1"	Force traefik from HTTP to HTTPS
AA_CRHTTPPORT	CR HTTP port. Default is 5432
AA_CRHTTPSPORT	CR HTTPS port
AA_CRLISTENPORT	Web server port. Default value is 80
AA_CRSERVICECONFIRMPASSWD	if AA_CRSETLOCALSERVICECRED= 0 then confirm password
AA_CRSERVICEPASSWD	if AA_CRSETLOCALSERVICECRED= 0 then password
AA_CRSERVICEUSERNAME	if AA_CRSETLOCALSERVICECRED= 0 then domain\user name
AA_CRSETLOCALSERVICECRED	1 if service logon as System 0 if service logon as specific user
AA_CRWCCERTPASSWD	Certificate password
AA_CRSELFSIGNCERT	1 for self signed certificate
AA_CRWCCERTPATH	Certificate path
AA_SDSFEATURE	true=Cloud deployment type false=OnPremises deployment type
AA_SETCLUSTERMODE	For cluster set 1 else 0
AA_SETUPTYPE	Setup type Custom or Express
INSTALLDIR	Installation Directory
IS_SQLSERVER_AUTHENTICATION	0 for Windows authentication
IS_SQLSERVER_DATABASE	SQL Database name
IS_SQLSERVER_SERVER	SQL server name (host name)

Elasticsearch Related Parameters

Parameter	Description
AA_ELASTICSEARCH_BACKUP	Used only if installing on first node of a backup server. Enter 1 if yes.  Note: The AA_ELASTICSEARCH_BACKUP parameter is used when you install an Enterprise Control Room as back up server for audit.
AA_ELASTICSEARCHSYSIP	Valid IP
AA_ESPASSWD	Password for Elasticsearch  Note: Additional parameter for confirming the password is not available. The password must have minimum 6 characters.

2. Option: Edit the sample script to use an Microsoft SQL Server database.
Use the script to install the Enterprise Control Room with the configuration options available in the installer.
 - a) Correct values for variables such as: \$service_username, \$service_pwd, \$db_server, \$scr_port.
 - b) Run the script with a Credentials in Service logon, and a non-secure connection using Microsoft SQL Server authentication with a new database.

Sample script:

```
$scr_port=80

$service_username= "domain\username" #e.g."aaspl-brd\ellie.brown"
$service_pwd="password"

#$certpath = "C:\SilentInstall\test256.pfx"
#$certpass = "changeit"

$db_server="localhost"
$cr_db_name="CRDB-NEW-SI-3"
$db_user="sa"
$db_pwd="Admin@123"

$elastic_password="Test@123"

$installation_path="C:\Program Files\Automation Anywhere"

#Install latest setup
$static_installation_path="\Enterprise\\""
$silent_details=" /s ", "v\"" -join "/"
$installpath_details=" /qn INSTALLDIR=\""

$deployment_details=" /AA_SDSFEATURE=true"

$custom_details=" /vAA_SETUPTYPE=Custom
```

```

/vAA_CUSTOMMODETYPE=1"

$port_cluster_details=" /vAA_SETCLUSTERMODE=0
                        /vAA_CRLISTENPORT=$cr_port"

#$service_details=" /vAA_CRSETLOCALSERVICECRED=0
                    /vAA_CRSERVICEUSERNAME=$service_username
                    /vAA_CRSERVICEPASSWD=$service_pwd
                    /vAA_CRSERVICECONFIRMPASSWD=$service_pwd"

$service_details=" /vAA_CRSETLOCALSERVICECRED=1"

#$db_details=" /vAA_BIMETADATADBTYPE=AA_BIMETADATADBTYPE
              /vIS_SQLSERVER_SERVER=$db_server
              /vIS_SQLSERVER_DATABASE=$cr_db_name
              /vIS_SQLSERVER_DATABASE1=$bi_db_name"

$db_details=" /vIS_SQLSERVER_SERVER=$db_server
             /vIS_SQLSERVER_USERNAME=$db_user
             /vIS_SQLSERVER_PASSWORD=$db_pwd
             /vIS_SQLSERVER_DATABASE=$cr_db_name
             /vIS_SQLSERVER_AUTHENTICATION=1"

$other=" /vAA_ESPASSWD=$elastic_password
        /vAA_CRWCHTTPPORT=80
        /vAA_CRWCHTTPSPORT=443
        /vAA_CRSELFSIGNCERT=1
        /vAA_OPTIONALCACERT=0
        /vAA_CRWCCERTPATH=$certpath
        /vAA_CRWCCERTPASSWD=$certpass
        /vLAUNCHPROGRAM=1
        /v""
        /LIweamoruc! log.txt""

$final_commandline = -join($silent_details,
    $installpath_details,$installation_path,
    $static_installation_path,$custom_details,
    $port_cluster_details,$service_details,
    $db_details,$pg_details,$other)

Write-Host $final_commandline
$a=Get-ChildItem $PSScriptRoot\* -Include *.exe
#$a = "C:\Silent\AutomationAnywhereEnterprise_A2019_<build>.exe"

Write-Host $a
Write-Host "Starting the installation wait for sometime..."

$processdetail=(Start-Process -FilePath
    $a -ArgumentList $final_commandline
    -Wait -PassThru).ExitCode

Write-Host $a.Name execution is done.
If installation is not proper check msi logs in the temp folder.
pause

```

3. Save the script you edit to the server for installation.
4. On the installation server, logged on as an Administrator, open Powershell in admin mode and execute:


```
Set-ExecutionPolicy Unrestricted -Scope CurrentUser -Force
```
5. Start Powershell in admin mode and execute:


```
.\install.ps1
```



Note: The silent install logs are stored in the folder from which the install script is executed. For example, if you run the script from C:\Silent Install, the logs are stored in C:\Silent Install folder.

Complete the Enterprise Control Room configuration and validation.

- [Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

- [Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

- [User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Complete Enterprise Control Room post-installation configuration

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

1. [Configure post-installation settings](#)

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

2. [Verify Automation Anywhere services](#)

Automation Anywhere specific services are installed on the Enterprise Control Room server.

3. [Configure Enterprise Control Room for HTTPS self-signed certificate](#) on page 374

Configure Enterprise Enterprise Control Room for HTTPS mode using a self-signed certificate either before or after doing a custom Enterprise Control Room configuration.

4. [Import HTTPS and CA certificates](#) on page 374

After installing the Enterprise Control Room, import a certificate for HTTPS, Certificate Authority (CA), or both using the Windows or Linux command prompt.

5. [Configure disaster recovery site for Elasticsearch IP addresses](#) on page 375

If you have configured the Enterprise Control Room for high availability (HA) and disaster recovery (DR) and installed the Enterprise Control Room on both the primary and secondary sites, configure Elasticsearch IP addresses for the secondary site.

Configuring post-installation settings

After you finish installing the Enterprise Control Room, configure specific items to ensure timely Automation Anywhere communications.

Post-installation tasks and settings

Exclude anti-virus

Exclude anti-virus scans from running in the Automation Anywhere local repository because they interfere with running bots.

Set the language locale

Select your language as the region setting.

The following example uses English (United States) as the region setting.

- Windows: Select Control Panel > Region > Administrative > Change system locale.

For usernames that contain non-ASCII characters, update the following settings:

1. From Control Panel > Clock and Region > Administrative > Change system locale, select the required language from the Current system locale list.
2. If available, clear the Beta: Use Unicode UTF-8 for worldwide language support check box.
3. To change the code page identifier, enter `chcp <identifier-code>` at the command prompt. For example, enter `chcp 949` to use ANSI or OEM Korean (Unified Hangul Code).

[Code Page Identifiers](#)

4. Restart your machine.

- Linux

1. Verify the current locale:

```
$ locale
```

2. Display a list of all available locales on the server:

```
$ locale -a
```

3. Depending on your operating system, use one of these options to set the locale for the whole server with the LANG variable.

Substitute language `en_US.UTF-8` with your own:

```
Ubuntu: sudo update-locale
        LANG=en_US.UTF-8 LANGUAGE
```



```
Red Hat Enterprise Linux: sudo  
localectl set-locale  
LANG=en_US.UTF-8
```

4. Update either the global locale settings file `etc/locale.conf` or settings `~/.bash_profile` for the user that owns Enterprise A2019:

```
LANG="en_US.utf8"  
export LANG
```

Set the region

Select your language as the region format.

Windows: Select Control Panel > Region > Format.

Set time synchronization

Enable Network Time Protocol (NTP) on the Enterprise Control Room.

For additional information about setting the NTP, contact your system administrator.

For Microsoft Azure platform installation, set configuration

Use the Microsoft Azure Portal to configure:

- Windows credentials
- Enterprise Control Room settings for repository, URL, and master key for Credential Vault
- Microsoft Active Directory authentication
- Optionally, SMTP settings

Related tasks

[Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

Related reference

[Verifying Automation Anywhere services](#) on page 372

Automation Anywhere specific services are installed on the Enterprise Control Room server.

[Working with SQL Servers](#) on page 294

Configure Microsoft SQL Servers before setting up the Enterprise Control Room database.

Verifying Automation Anywhere services

Automation Anywhere specific services are installed on the Enterprise Control Room server.



Linux users: See [Stop and start Enterprise Control Room services on Linux](#) on page 1146.

Verify installed Windows services

From your Windows device:

1. Select Control Panel > Administrator Tools > Services.

The specific path to Services can vary, depending on your specific Windows version.

2. Scroll through the list to find the listed service name. Note the Status.

Enterprise Control Room installed services

Verify that the following Windows services are installed by the Automation Anywhere Enterprise Control Room installer.

Service name	Description
Automation Anywhere Bot Compiler Service	Stores all details about the bot compile service. Receives and processes Bot compilation requests for the Enterprise Control Room.
Automation Anywhere Control Room Caching	Used for distributed cache storage.
Automation Anywhere Control Room IQ Bot Service	Used for IQ Bot A2019.
Automation Anywhere Control Room Messaging	Allows Enterprise Control Room services to communicate asynchronously.
Automation Anywhere Control Room Reverse Proxy	Receives all incoming HTTP and HTTPS requests for Automation Anywhere products and forwards to the correct service.
Automation Anywhere Control Room Robotic Interface Service	Is the Automation Anywhere Robotic Interface service used to create and orchestrate workflows between forms and bots.
Automation Anywhere Control Room Service	Receives and processes API requests for the Enterprise Control Room.
Automation Anywhere Elastic Search Service	Stores all logs and related activities for search functionality. For details about Elasticsearch, see Elastic Stack and Product Documentation .
Automation Anywhere Control Room Discovery Bot Service	Used for Discovery Bot.

- All the services can be configured either in the Local System or Domain account when the Enterprise Control Room is installed in Custom mode. For an Enterprise Control Room installed in Express mode, all the services are run in the Local System account.
- By default, the Automation Anywhere services restart automatically after a system reboot.

Related concepts

[Installing Enterprise Control Room using Custom mode](#) on page 330

Log in to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Custom Mode to select installation and configuration options, including installing non-default requirements. Select this mode for a data center deployment.

Related tasks

[Installing Enterprise Control Room using Express mode](#) on page 338

[Installing Enterprise Control Room on Linux](#) on page 359

You start installing the Automation Anywhere Enterprise Control Room in the Linux environment and complete the installation in the Enterprise Control Room.

Configure Enterprise Control Room for HTTPS self-signed certificate

Configure Enterprise Enterprise Control Room for HTTPS mode using a self-signed certificate either before or after doing a custom Enterprise Control Room configuration.

To configure Enterprise Control Room for HTTPS mode using a self-signed certificate, do the following steps:

1. Double-click the Enterprise Control Room icon.
The Enterprise Control Room instance launches in Microsoft Internet Explorer.
2. Change the Enterprise Control Room URL setting and port to **HTTPS** and port number to **443**.
The Website Security Warning page launches.
3. Continue to this website to access the Enterprise Control Room.

Proceed to [Configure Enterprise Control Room authentication options](#) on page 378. If you have already configured it, then log in to the Enterprise Control Room.

Related tasks

[Import HTTPS and CA certificates](#) on page 374

After installing the Enterprise Control Room, import a certificate for HTTPS, Certificate Authority (CA), or both using the Windows or Linux command prompt.

Import HTTPS and CA certificates

After installing the Enterprise Control Room, import a certificate for HTTPS, Certificate Authority (CA), or both using the Windows or Linux command prompt.

These instructions apply to both Windows and Linux installations.

To import a CA or HTTPS certificate for configuring the Enterprise Control Room for secure connection using the command prompt, perform the following steps:

1. Run the command prompt in administrator mode.
2. Copy the Automation Anywhere installation path.
The default installation path for Windows is `C:\Program Files\Automation Anywhere\Enterprise`.
The default installation path for Linux is `/opt/automationanywhere/enterprise`
3. Enter or paste the following at the command prompt:

- For Windows HTTPS certificate, enter the command:

```
jdk11\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -setServerCert "C:\Users\craadmin\Desktop\test_automationanywhere_com.pfx" -privateKeyPass <PFX Password>
```

- For Linux CentOS HTTPS certificate, enter the command:

```
jdk11/bin/java -jar certmgr.jar -appDir "/opt/automationanywhere/enterprise" -setServerCert "/home/<user>/test_automationanywhere_com.pfx" -privateKeyPass <PFX Password>
```

- For Windows CA certificate, enter the command:

```
jdk11\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -importTrustCert "D:\<user name>\My Downloads\CA31.cer"
```

- For Linux CentOS CA certificate, enter the command:

```
jdk11/bin/java -jar certmgr.jar -appDir "/opt/automationanywhere/enterprise" -importTrustCert "CA31.cer"
```

4. During the installation, if you did not accept the default and indicated you want to upload your own (self-signed) certificate, add the following parameters to the `boot.db.properties` file that is located in the `config` folder, in the Automation Anywhere installation path.

- Windows file location:

```
root:\Program Files\Automation Anywhere\Enterprise\config\boot.db.properties
```

- Linux file location:

```
/opt/automationanywhere/enterprise/config/boot.db.properties
```

Parameter:

```
trustServerCertificate=false
```

Configure disaster recovery site for Elasticsearch IP addresses

If you have configured the Enterprise Control Room for high availability (HA) and disaster recovery (DR) and installed the Enterprise Control Room on both the primary and secondary sites, configure Elasticsearch IP addresses for the secondary site.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Complete the Enterprise Control Room installation on both the primary and secondary DR sites.

Perform this task to make the IP address of the secondary DR site Elasticsearch available to the primary DR site.

1. From the primary site Enterprise Control Room, navigate to Administration > Settings > General > Control Room Database & Software.
2. Click Edit.
3. Enter the DR secondary site Cluster IP address in the Elasticsearch disaster recovery backup cluster field.
4. Click the plus sign to add additional cluster IP addresses.
5. Click Save Changes.

Related concepts

[High availability and disaster recovery deployments](#) on page 321

High availability (HA) provides a failover solution if an Enterprise Control Room service, server, or database fails. Disaster recovery (DR) provides a recovery solution across a geographically separated distance in the event of a disaster that causes an entire data center to fail.

Related tasks

[Perform disaster recovery failover](#) on page 328

Perform the required failover steps for Automation Anywhere Enterprise recovery at the physically remote secondary site after a disaster at the primary site.

Uninstalling Enterprise A2019

Use the Automation Anywhere Enterprise installer or the Uninstall or change a program option from the Windows Control Panel to remove or uninstall an Enterprise Control Room instance.

1. To uninstall the Enterprise Control Room using the installer, run the Automation Anywhere Enterprise setup file from the installation path.
Run the installer in admin mode.
2. In the Automation Anywhere Enterprise InstallShield wizard, click Next.
3. Click Remove.
4. Click Finish to complete uninstalling the Enterprise Control Room from your machine or server.

Related concepts

[Migrate to Enterprise A2019](#) on page 430

Migrate to the latest Enterprise A2019 version from Automation Anywhere Enterprise versions 11.x or 10.x.

Related reference

[Installing Enterprise Control Room On-Premises](#) on page 284

Review the installation core tasks and topics for installing A2019 Enterprise Control Room in a data center on an On-Premises server or a cloud service provider server instance.

Installing Enterprise Control Room for Cloud-enabled deployment

With Cloud-enabled deployment, you can store and process native business and operational data on site and take advantage of management and operational services delivered from Automation Anywhere Enterprise Cloud.

Automation Anywhere deploys and provisions an Enterprise A2019 Cloud-enabled service instance in our cloud to deliver management and operational capabilities. Customer then installs the Cloud-enabled application within their infrastructure to consume these capabilities for storing and processing customer data.



Note: Linux is not supported for Cloud-enabled deployments.

For Cloud-enabled deployment, the initial welcome email that you received from Automation Anywhere contains:

- URL to the Automation Anywhere Enterprise Cloud-enabled instance
- Provisioning token needed to establish trust connectivity with the Automation Anywhere Enterprise Cloud Control Room



Important: Do not discard the content of this email. You will need the information in the email to setup on-premises application.

1. Receive your Enterprise A2019 Cloud-enabled service URL from Automation Anywhere Enterprise and provisioning token.
2. Install and access the On-Premises application.
Download and install the Cloud-enabled application on your network; the installation user is assigned administrator privileges.
[Installing Enterprise Control Room On-Premises](#) on page 284
3. Log in to the On-Premises Enterprise Control Room.
[Log in to Automation Anywhere Enterprise Control Room](#) on page 398
4. Navigate to Administration > Settings > Cloud-Enabled.
5. Provide the provisioning token to connect to the Enterprise Control Room.
6. Click Save changes.
The trusted relationship between the instances is created.
7. To test Cloud-Enabled functionality, open a browser, enter the URL of the Cloud Control Room service instance, and press Enter.
You are redirected to the On-Premises Enterprise Control Room.

Related concepts

[Post-installation user management](#) on page 377

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

Related tasks

[Install Bot agent and register device](#) on page 400

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

Related reference

[Installed Enterprise Control Room directories and files](#) on page 390

When installing the Automation Anywhere Enterprise Control Room on different operating systems, the installer executes and installs files and folders in the following directories.

Post-installation user management

After completing the post-installation tasks, validate the setup by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through the configuration for your authentication method.

[Configure Enterprise Control Room authentication options](#) on page 378

The options for launching the Enterprise Control Room for the first time depend on the installation mode and, for Custom mode installation, the authentication method.

Validate services

Validate that the following services are running in automatic mode:

- Automation Anywhere Control Room Caching
- Automation Anywhere Control Room Messaging

- Automation Anywhere Control Room Reverse Proxy
- Automation Anywhere Control Room Service
- Automation Anywhere Elastic Search Service

[User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Related tasks

[Complete Enterprise Control Room post-installation configuration](#) on page 370

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified and confirm Automation Anywhere services are running.

Configure Enterprise Control Room authentication options

The options for launching the Enterprise Control Room for the first time depend on the installation mode and, for Custom mode installation, the authentication method.

After completing the installation in Custom Mode, configure the Enterprise Control Room in Custom Mode to authenticate users with either an Active Directory (AD), Enterprise Control Room database, or Single Sign-On.



Note: These topics apply to Enterprise A2019, not the Community Edition.

Related tasks

[Express Enterprise Control Room configuration](#) on page 378

After completing the installation in Express Mode, configure the Enterprise Control Room in Express Mode using the default settings.

[Configure Enterprise Control Room for Active Directory: manual mode](#) on page 379

Configure the Enterprise Control Room to authenticate users using Active Directory by manually adding the Lightweight Directory Access Protocol (LDAP) URLs.

[Configure Enterprise Control Room for Active Directory: auto mode](#) on page 382

Configure the Enterprise Control Room to authenticate users using Active Directory by enabling the Enterprise Control Room to discover and list domains and sites in your organization.

[Configure Enterprise Control Room database](#) on page 384

Configure the Enterprise Control Room to authenticate users using the database option.

[Configure Enterprise Control Room for HTTPS self-signed certificate](#) on page 374

Configure Enterprise Enterprise Control Room for HTTPS mode using a self-signed certificate either before or after doing a custom Enterprise Control Room configuration.

Express Enterprise Control Room configuration

After completing the installation in Express Mode, configure the Enterprise Control Room in Express Mode using the default settings.

To configure Enterprise Control Room when you start it for the first time, do the following steps:

1. Open Enterprise Control Room in a browser to launch the Getting Started wizard.

- Windows: Double-click the Automation Anywhere Enterprise Control Room icon on the desktop.
 - Linux: Open a browser and navigate to the Linux server hostname. Example:
`server1.mycompany.com`
2. Fill in the following fields:
 - Username: Enter a user name.
 - First name: Enter the first name.
 - Last name: Enter the last name.
 - Email: Enter an email address.
 - Password: Enter a password.
 - Confirm password: Confirm the password.
 3. Click Next.
The Create security questions page appears.
 4. Enter three security questions and answers.
 5. Click Next.
The Credential settings page appears.
 6. Select from the following options:
 - Express mode: The system stores your master key to connect to the Credential Vault. This option is not recommended for a production environment.
 - Manual mode: You store the Master Key on your own, and then provide the Master Key when the Credential Vault is locked. Users use the Master Key to connect to the Credential Vault to secure their credentials and access them when creating and running TaskBots.



Warning: If you lose the key, you will not be able to access the Enterprise Control Room.

7. Click Save and log in.
You are logged in to the Enterprise Control Room as an administrator. You can now configure and manage the overall RPA environment with Enterprise Control Room and clients.

After configuring the Enterprise Control Room, install product licenses.

Configure Enterprise Control Room for Active Directory: manual mode

Configure the Enterprise Control Room to authenticate users using Active Directory by manually adding the Lightweight Directory Access Protocol (LDAP) URLs.

To configure the Enterprise Control Room when you start it for the first time, do the following:

1. Double-click the Automation Anywhere Enterprise Control Room icon on your desktop.
The Configure Enterprise Control Room settings page appears.
2. Type the repository path.
This is the location where the uploaded automation files, for example, IQ Bots, and TaskBots are stored. For example, `C:\ProgramData\AutomationAnywhere\Server Files`.
3. Enter the access URL.
This is the URL for accessing your installation of Enterprise Control Room.
4. Click Save and continue.



Warning: The back button of your web browser is automatically disabled after you click Save and continue. This ensures that the Credential Vault Master Key that generates matches the repository path and Enterprise Control Room access URL.

To return to the Configure Enterprise Control Room settings page, press **Ctrl** plus **F5** and restart.

The Credential Vault settings page appears.

5. Select from the following options:

- Express mode: The system stores your master key to connect to the Credential Vault. This option is not recommended for a production environment.
- Manual mode: You store the Master Key on your own, and then provide the Master Key when the Credential Vault is locked. Users use the Master Key to connect to the Credential Vault to secure their credentials and access them when creating and running TaskBots.



Warning: If you lose the key, you will not be able to access the Enterprise Control Room.

6. Click Save and continue.



Warning: The back button of the web browser is automatically disabled after you click Save and continue. No further changes to the Enterprise Control Room configuration or Credential Vault settings are allowed.

To make changes, reinstall the Enterprise Control Room.

The Authentication type for Enterprise Control Room users page appears.

7. Select Active Directory.

Automation Anywhere supports Active Directory Multi-Forest authentication for the Enterprise Control Room. Before providing the Authentication Type, ensure the following:

- One-way or two-way trust is set up between all forests. For a one-way trust, this is from the Enterprise client forest to the Enterprise Control Room forest (Enterprise Control Room forest must always be the trusting forest).
- Two-way trust is set up for every domain in a forest.
- The root certificate of the LDAP server is imported using the provided CertMgr tool via command.
- The provided LDAP URLs per forest cannot be behind a load balancer. Also, all LDAP URLs must point to the root (main) domain controllers.
- The node that runs the Enterprise Control Room is in the same domain network where the Active Directory runs.
- The user is in the parent domain and the URL points to the parent.

This ensures that when there are two or more forests, and one of the forest has a subdomain with a different name space, a user from the other forests does not have permission to access that subdomain.

8. Type the Global Catalog URL.

For example, `ldap://server01.domain.com`.

For failsafe authentication, click the plus option to provide additional LDAP URLs.



Note: For users and groups from one or more Active Directory domains, to access the Enterprise Control Room, use a fully qualified host name of the Global Catalog (GC) server, listening on port 3268 (3269 if SSL).

When adding LDAP URLs, ensure that you provide a fully qualified host name like `ldap://server01.ldap.com`.

Provide URLs of multiple Global Catalogs per forest so that if one Global Catalog in a forest goes down, the other can serve. This feature does not provide support for the load-balanced URL.

You must enter the Domain username and password and click **Manually add connections** to enter the LDAP URLs.

9. Provide service account credentials

Ensure that the username provided is a user in the Domain Users group and ideally and be set up in Active Directory with a password never expires option. If otherwise, there will be some downtime in RPA authentication as the service account password is reset. Provide the username in a User Principal Name (UPN) in the [username@domain.com](#) format and password.

10. Click **Check connection**.

If Enterprise Control Room is unable to connect to the Active Directory database, an error message appears.

11. Click **Next**.

The Enterprise Control Room first administrator page appears.

12. Select the Active Directory domain from the drop-down list and type the Enterprise Control Room administrator username.

13. Click **Check name in Active Directory**.

If the username is in the Active Directory the following user details are shown:

- First name
- Last name
- Email

You can edit these prepopulated fields.

14. Click **Save and log in**.

You are logged in to the Enterprise Control Room as an administrator. You can now configure and manage the overall RPA environment with Enterprise Control Room and clients.

After configuring the Enterprise Control Room, install product licenses.

Related tasks

[Configure Enterprise Control Room for Active Directory: auto mode](#) on page 382

Configure the Enterprise Control Room to authenticate users using Active Directory by enabling the Enterprise Control Room to discover and list domains and sites in your organization.

Configure LDAP channel binding

Configure LDAP channel binding in Enterprise A2019 On-Premises for enhanced security in network communications between an Active Directory and its clients. This method provides a more secure LDAP authentication over SSL and TLS.

Enable channel binding in the `um.properties` file when required.

1. Go to the Enterprise Control Room installation path.
2. From the list of files in the `config` folder, open the `um.properties` file with an XML editor.
3. Add the `um.ldap.channel.binding.enabled` property in the `um.properties` file.
For example, `um.ldap.channel.binding.enabled=false`
4. To enable channel binding, change the value to `true`.

The default value is `false` and channel binding is disabled.

Channel binding is enabled if it is enabled on the server side.

For information about enabling channel binding on the server side, see [LDAP enforce channel binding registry entry](#).

5. Save the file.

Configure Enterprise Control Room for Active Directory: auto mode

Configure the Enterprise Control Room to authenticate users using Active Directory by enabling the Enterprise Control Room to discover and list domains and sites in your organization.

To configure the Enterprise Control Room when you start it for the first time, do the following:

1. Double-click the Automation Anywhere Enterprise Control Room icon on your desktop.
The Configure Enterprise Control Room settings page appears.
2. Type the repository path.
This is the location where the uploaded automation files, for example, IQ Bots, and TaskBots are stored. For example, `C:\ProgramData\AutomationAnywhere\Server Files`.
3. Enter the access URL.
This is the URL for accessing your installation of Enterprise Control Room.
4. Click Save and continue.



Warning: The back button of your web browser is automatically disabled after you click Save and continue. This ensures that the Credential Vault Master Key that generates matches the repository path and Enterprise Control Room access URL.

To return to the Configure Enterprise Control Room settings page, press `Ctrl` plus `F5` and restart.

The Credential Vault settings page appears.

5. Select from the following options:
 - Express mode: The system stores your master key to connect to the Credential Vault. This option is not recommended for a production environment.
 - Manual mode: You store the Master Key on your own, and then provide the Master Key when the Credential Vault is locked. Users use the Master Key to connect to the Credential Vault to secure their credentials and access them when creating and running TaskBots.



Warning: If you lose the key, you will not be able to access the Enterprise Control Room.

6. Click Save and continue.



Warning: The back button of the web browser is automatically disabled after you click Save and continue. No further changes to the Enterprise Control Room configuration or Credential Vault settings are allowed.

To make changes, reinstall the Enterprise Control Room.

The Authentication type for Enterprise Control Room users page appears.

7. Select Active Directory.

Automation Anywhere supports Active Directory Multi-Forest authentication for the Enterprise Control Room. Before providing the Authentication Type, ensure the following:

- One-way or two-way trust is set up between all forests. For a one-way trust, this is from the Enterprise client forest to the Enterprise Control Room forest (Enterprise Control Room forest must always be the trusting forest).
- Two-way trust is set up for every domain in a forest.
- The root certificate of the LDAP server is imported using the provided CertMgr tool via command.

- The provided LDAP URLs per forest cannot be behind a load balancer. Also, all LDAP URLs must point to the root (main) domain controllers.
- The node that runs the Enterprise Control Room is in the same domain network where the Active Directory runs.
- The user is in the parent domain and the URL points to the parent.

This ensures that when there are two or more forests, and one of the forest has a subdomain with a different name space, a user from the other forests does not have permission to access that subdomain.

8. Type the Domain username.

Ensure you use the User Principal Name (UPN) in the `username@domain.com` format.

The username you enter is for a user who has access to all domains using the same credentials.

9. Type the Domain password.

This user is not expected to use the Enterprise Control Room. Although you have an option to update the password, use an Account with the password never expires option. If it expires, it can be updated but with some downtime.

10. Click Discover connections.

All discovered Active Directory domains with one or more sites per domain are shown.

By default all domains and sites are selected. If only one domain and one site under it is discovered, then it is shown in read-only mode and cannot be edited.

11. Select the domains and sites to use for authentication.

Select the domains and sites to use for authentication. Select a minimum of one site for each domain that is selected

12. Click Test connections to register the sites to use for authentication.

13. Click Check connection.

If Enterprise Control Room is unable to connect to the Active Directory database, an error message appears.

14. Click Next.

The Enterprise Control Room first administrator page appears.

15. Select the Active Directory domain from the drop-down list and type the Enterprise Control Room administrator username.

16. Click Check name in Active Directory.

If the username is in the Active Directory the following user details are shown:

- First name
- Last name
- Email

You can edit these prepopulated fields.

17. Click Save and log in.

You are logged in to the Enterprise Control Room as an administrator. You can now configure and manage the overall RPA environment with Enterprise Control Room and clients.

After configuring the Enterprise Control Room, install product licenses.

Related tasks

[Configure Enterprise Control Room for Active Directory: manual mode](#) on page 379

Configure the Enterprise Control Room to authenticate users using Active Directory by manually adding the Lightweight Directory Access Protocol (LDAP) URLs.

[Configure Enterprise Control Room database](#) on page 384

Configure the Enterprise Control Room to authenticate users using the database option.

Configure Enterprise Control Room database

Configure the Enterprise Control Room to authenticate users using the database option.

To configure the Enterprise Control Room when you start it for the first time, do the following:

1. Open a browser and navigate to the Enterprise Control Room URL.

The Configure Enterprise Control Room settings page appears.

- Windows

Double-click the Automation Anywhere Enterprise Control Room icon on your desktop.

- Linux

Open a browser and navigate to the host name of the server on which you installed Automation Anywhere Enterprise Control Room. Example: `myserver.mycompany.com`



Note: Do not retain a following slash at the end of the URL, as the validation will fail.

2. Enter the repository path.

- Windows

This is the location where the uploaded automation files, for example, IQ Bot s, and TaskBots are stored. For example,

`C:\ProgramData\AutomationAnywhere\Server Files`

- Linux

`/opt/automationanywhere/enterprise/appdata`

3. Enter the access URL.

This is the URL for accessing your installation of Enterprise Control Room.

4. Click Save and continue.



Warning: The back button of your web browser is automatically disabled after you click Save and continue. This ensures that the Credential Vault Master Key that generates matches the repository path and Enterprise Control Room access URL.

To return to the Configure Enterprise Control Room settings page, press `Ctrl plus F5` and restart.

The Credential Vault settings page appears.

5. Select from the following options:

- Express mode: The system stores your master key to connect to the Credential Vault. This option is not recommended for a production environment.
- Manual mode: You store the Master Key on your own, and then provide the Master Key when the Credential Vault is locked. Users use the Master Key to connect to the Credential Vault to secure their credentials and access them when creating and running TaskBots.



Warning: If you lose the key, you will not be able to access the Enterprise Control Room.

6. Click Save and continue.



Warning: The back button of the web browser is automatically disabled after you click Save and continue. No further changes to the Enterprise Control Room configuration or Credential Vault settings are allowed.

To make changes, reinstall the Enterprise Control Room.

The Authentication type for Enterprise Control Room users page appears.

7. Select Control Room database.

8. Click Next.

The Enterprise Control Room first administrator page appears.

9. Fill in the following fields:

- Username: Enter a user name.
- First name Enter the first name.
- Last name Enter the last name.
- Email Enter an email address.
- Password Enter a password.
- Confirm password Confirm the password.

10. Click Next.

The Create security questions page appears.

11. Enter three security questions and answers.

12. Click Save and log in.

You are logged in to the Enterprise Control Room as an administrator. You can now configure and manage the overall RPA environment with Enterprise Control Room and clients.

Install a license.

Related tasks

[Configure Enterprise Control Room for Active Directory: manual mode](#) on page 379

Configure the Enterprise Control Room to authenticate users using Active Directory by manually adding the Lightweight Directory Access Protocol (LDAP) URLs.

[Configure Enterprise Control Room for Active Directory: auto mode](#) on page 382

Configure the Enterprise Control Room to authenticate users using Active Directory by enabling the Enterprise Control Room to discover and list domains and sites in your organization.

Configure Enterprise Control Room for HTTPS self-signed certificate

Configure Enterprise Enterprise Control Room for HTTPS mode using a self-signed certificate either before or after doing a custom Enterprise Control Room configuration.

To configure Enterprise Control Room for HTTPS mode using a self-signed certificate, do the following steps:

1. Double-click the Enterprise Control Room icon.

The Enterprise Control Room instance launches in Microsoft Internet Explorer.

2. Change the Enterprise Control Room URL setting and port to **HTTPS** and port number to **443**.

The Website Security Warning page launches.

3. Continue to this website to access the Enterprise Control Room.

Proceed to [Configure Enterprise Control Room authentication options](#) on page 378. If you have already configured it, then log in to the Enterprise Control Room.

Related tasks

[Import HTTPS and CA certificates](#) on page 374

After installing the Enterprise Control Room, import a certificate for HTTPS, Certificate Authority (CA), or both using the Windows or Linux command prompt.

Import HTTPS and CA certificates

After installing the Enterprise Control Room, import a certificate for HTTPS, Certificate Authority (CA), or both using the Windows or Linux command prompt.

These instructions apply to both Windows and Linux installations.

To import a CA or HTTPS certificate for configuring the Enterprise Control Room for secure connection using the command prompt, perform the following steps:

1. Run the command prompt in administrator mode.
2. Copy the Automation Anywhere installation path.

The default installation path for Windows is C:\Program Files\Automation Anywhere\Enterprise.

The default installation path for Linux is /opt/automationanywhere/enterprise

3. Enter or paste the following at the command prompt:

- For Windows HTTPS certificate, enter the command:

```
jdk11\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -setServerCert "C:\Users\cradmin\Desktop\test_automationanywhere_com.pfx" -privateKeyPass <PFX Password>
```

- For Linux CentOS HTTPS certificate, enter the command:

```
jdk11/bin/java -jar certmgr.jar -appDir "/opt/automationanywhere/enterprise" -setServerCert "/home/<user>/test_automationanywhere_com.pfx" -privateKeyPass <PFX Password>
```

- For Windows CA certificate, enter the command:

```
jdk11\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -importTrustCert "D:\<user name>\My Downloads\CA31.cer"
```

- For Linux CentOS CA certificate, enter the command:

```
jdk11/bin/java -jar certmgr.jar -appDir "/opt/automationanywhere/enterprise" -importTrustCert "CA31.cer"
```

4. During the installation, if you did not accept the default and indicated you want to upload your own (self-signed) certificate, add the following parameters to the boot.db.properties file that is located in the config folder, in the Automation Anywhere installation path.

- Windows file location:

```
root:\Program Files\Automation Anywhere\Enterprise\config\boot.db.properties
```

- Linux file location:

```
/opt/automationanywhere/enterprise/config/boot.db.properties
```

Parameter:

```
trustServerCertificate=false
```

Add Enterprise Control Room self-signed certificate to Java Credential Store

Manually add or update the Enterprise Control Room self-signed certificate to the Java Credential Store to ensure that the Bot agent is registered successfully and works as intended. Perform this task if the Java Credential Store does not accept the self-signed certificate and you see a certificate path validation error.

Ensure the Enterprise Control Room self-signed certificate is downloaded to <root>:\AA\A2019cert.cer and installed on the Bot agent machine using `mmc.exe` as a trusted certificate.

To resolve the certificate on the browser of the Bot agent machine, download and install the self-signed certificate.

1. To download the self-signed certificate using Google Chrome, perform these steps:
 - a) Open the Enterprise Control Room instance used to access the Bot agent.
 - b) Press the function key F12 to open the developer window.
 - c) Navigate to the Security tab and click View certificate.
The Certificate window appears.
 - d) In the Details tab, click Copy to file.
The Certificate export wizard appears. You export and save the certificate in the required .CER format from this window.
 - e) Click Next and select the Base-64 encoded X.509 (.CER) option.
 - f) Export and save the file to a location of your choice.

To import the self-signed certificate, do the following:

2. Open the command window.
3. Enter `MMC` to launch the console window.
4. Select File > Add/Remove Snap-in.
5. Double-click Certificates and then select My user account in the Certificates snap-in window.
6. Click Finish and OK to return to the console window.
The console window now shows certificates for current user.
7. Open the Personal folder to Import the AA certificate.

Now add or update the self-signed certificate to the Java Credential Store as an admin user using the command prompt.

8. Enter <root>:\Program Files\Automation Anywhere\Bot Agent\jre\bin to navigate to the Java Runtime Environment (JRE) path on the Bot agent device.
9. Enter the following parameters:

```
keytool -import -alias CRA2019cert -keystore "<root>:\Program Files
Automation Anywhere\Bot Agent\jre\lib\security\cacerts" -file
"<root>:\AA\A2019cert.cer"
```

You are prompted to enter the keystore password.

10. Enter the password as `changeit`.
11. Enter `Y` at the next prompt.
The Enterprise Control Room self-signed certificate is imported successfully.
12. Restart the Bot agent device to validate that the device is registered successfully.

Preparing for users

After completing initial installation and depending upon your deployment option, the post-installation configuration and validation, you are ready to prepare for users to login and work with bots.

See [User management](#) on page 1104.

Trial licenses

Automation Anywhere Enterprise Control Room trial License comes with an evaluation period of 30 days. This provides the user with an ability to assess the product and make an informed decision.

Trial licenses offer three [Bot Creators](#) and two [Bot Runners](#) to begin with; also a user can contact System Administrator or Automation Anywhere Sales to purchase a new license or extend the existing trial license.

To purchase an extended license or to install a new license:

1. Login to Enterprise Control Room as an Admin and the Dashboard homepage is displayed.
2. A notification is displayed with remaining days for license expiry. Click Show details. A message appears with a link to Install a new license or to contact System Administrator or Automation Anywhere Sales

To view bot license and usage statistics, go to Administration > Click Licenses.



Note: Product and bot user license statistics is only visible to users with Admin role and users with License management permission,

The License page shows Product and bot User license statistics with details.

Set up SAML authentication

Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.



Note: The SAML IDP side setup must be validated before configuring the Enterprise Control Room. See [Configure the Enterprise Control Room as a service provider](#).

To switch the Enterprise Control Room to a SAML-authenticated environment, follow these steps:

1. Navigate to Administration > Settings > User authentication.
2. Click Edit.
3. Select the Use SAML option.



Note: The Use Control Room database option is selected by default.

4. In the SAML metadata field, enter the data from your SAML IDP setup.

```
<saml2:AuthnStatement
  AuthnInstant="authenticated_instance" SessionIndex="index_value_required">
```

5. In the Unique Entity ID for Control Room (Service Provider) field, enter the entity ID.
6. In the Encrypt SAML Assertions field, select one of the following options:

Option	
Do not encrypt	SAML assertions are not encrypted.
Encrypt	SAML assertions are encrypted.

7. Optional: Enter the Public key and Private key values.



Note: Enter keys only if you require encrypted SAML assertions.

8. Click Validate SAML Settings.

You are required to validate your SAML 2.0 settings before saving your changes.

When you click this option, you will be redirected to a SAML 2.0 service provider web page where you will be prompted to enter credentials and other data.

9. Enter a different username.

After validation is complete, you will be redirected back to this configuration page.

If the username already exists, an error appears.

10. Click Save changes.

Log back in to the system with your new credentials.

Related tasks

[Configure the Enterprise Control Room as a service provider](#)

Edit profile

Manage user profiles.

For users of Enterprise Control Room configured with a non-directory environment, change the password, first name, last name, and email address.

1. Click the Device icon and select Update credentials.
2. In the Device login credentials section, enter the Username and Password for the device.
Device login credentials are required to run a bot from this device.



Note: Enterprise A2019 does not validate the device login credentials until you run a bot.

If your username is part of a domain, include the domain within the format `domain\username`. Typically, home users are not part of a domain, unless they are specifically configured.

If your username contains non-ASCII characters, ensure your system locale settings are configured to use these characters.

[Configuring post-installation settings](#) on page 371

3. Click Update

Installed Enterprise Control Room directories and files

When installing the Automation Anywhere Enterprise Control Room on different operating systems, the installer executes and installs files and folders in the following directories.

Window OS directory structure

When you install the Automation Anywhere Enterprise Control Room on Windows OS, the default installation directory for many configuration files is located:

`C:\Program Files\Automation Anywhere\Enterprise\`

Linux OS directory structure

When you install the Automation Anywhere Enterprise Control Room on Linux OS, the installer creates the following directories.

Directory path	Description	Comments
<code>/opt/automationanywhere/enterprise</code>	All binary files	
<code>/opt/automationanywhere/enterprise/config</code>	Config files	
<code>/var/log/automationanywhere/enterprise</code>	Log files	
<code>/tmp</code>	Temporary files	Directory that contains temporary files created by the system and users. Files under this directory are deleted when the system is rebooted.
<code>/opt/automationanywhere/enterprise/appdata</code>	Server files	Enterprise Control Room repository folder.
<code>/opt/automationanywhere/enterprise/_Automation\ Anywhere\ Enterprise_installation/Logs/</code>	Installer logs	Installation logs provide details about issues during installation, if any.

Enterprise Control Room Fail-Safe status

When the Enterprise Control Room is unable to connect to the license server, it moves into Fail-Safe status.

With respect to the Enterprise Control Room license server database, the Enterprise Control Room can be in one of three status states. These states indicate what user licensing actions can be done. With each state change, an entry is made in the audit log.

Active	Normal operations. All API calls from the Enterprise Control Room are accepted by the license server. Users can be assigned floating licenses as they log on. Floating licenses can be released as users log off.
Fail-Safe	Only the heartbeat API call is allowed to the license server. All other calls from the Enterprise Control Room are stopped. Operations, such as granting logging in users a license, or deleting a license assigned to a logged in user are restricted.
Fail-Safe-Expired	The Enterprise Control Room stops all operations, all users are logged out of the Enterprise Control Room.

Fail-Safe mode actions

When the Enterprise Control Room loses connection with the licensing server and moves into Fail-Safe mode:

- The Enterprise Control Room administrator is sent an email notification, saying the Enterprise Control Room is in Fail-Safe mode. The administrator can take remedial action to re-establish the connection.
- Currently logged in users continue to have access and can do tasks.
- User licenses cannot be allocated to or de-allocated from users.

Fail-Safe-Expired mode actions

When the Fail-Safe time limit expires, the Enterprise Control Room moves into Fail-Safe-Expired state:

- All connected users are shut down.
- The Enterprise Control Room reports Shutdown status to the license server.
- The Enterprise Control Room shuts down.

Active mode actions

When the Enterprise Control Room is restarted and operational, and connectivity to the license server established, the Enterprise Control Room is in Active state:

- Users who had assigned licenses prior to the Fail-Safe, have their original licenses re-allocated.
- New users can request and be allocated licenses.

Enterprise A2019 licenses

The All Licenses page displays detailed information about current product and device licenses.

Product licenses

The Automation Anywhere Enterprise Control Room is the web-based application at the center of the Digital Workforce providing enterprise-wide management and control. The Enterprise Control Room ensures reliable, scalable, and secure bot deployment and execution. From this central vantage point, operators can receive tasks from the Bot Creator and push to the Bot Runners for execution with simple mouse clicks. The Enterprise Control Room monitors and audits all scheduled and running bots, in real time.

The Enterprise Control Room provides an automated mechanism for tracking and controlling the use of licensed software across Bot Creators and Bot Runners, addressing NIST Change Management CM-10.

Device licenses

License	Permission
Bot Creator	Users with this license can create, edit, schedule, and trigger bots. Additionally, these users can execute bots in the following ways: - On their local machine - From the public workspace if the Enterprise Control Room administrator has specified a Run as user for unattended Bot Runner
Bot Runner	Users with this license can execute bots, independently and asynchronously.
Unattended Bot Runner Run-time license	Users with this license can perform all automation tasks that attended users can perform. Additionally, this license can also be used for Automation Anywhere Enterprise Control Room deployment, centralized scheduling, and API-based deployment.  Note: Triggers must be associated only with users who have an attended Bot Runner license. If you include users with unattended Bot Runner licenses, they must provide the login credentials of the default device.
Attended Bot Runner Run-time license	Users with this license can run bots on their devices. However, these users cannot run or schedule bots on another device.
Citizen Developer license	Users with this license can create and run bots (including bots with triggers) on their devices. Create a Citizen Developer role on page 1121

License	Permission
IQ Bot A2019	IQ Bot automates business processes that rely on semi-structured or unstructured data. IQ Bot licenses are purchased based on the number of pages of processing required.
Bot Insight	Bot Insight provides real-time, RPA native analytics for both business insights and operational intelligence. The Bot Insight license is purchased on a per-user basis. To access the Business dashboard, the user must be assigned this license.
Automation Anywhere Robotic Interface	The Enterprise Control Room can combine the AARI user license with the Bot Creator and Bot Runner (attended and unattended) license types, which enables the user to access AARI on the web.
Discovery Bot	Process Discovery licenses must be purchased for use for business analysts and business users using Discovery Bot. Discovery Bot supports two licenses. The business analyst uses the process analyzer license to view and manage the metadata from all recordings within the process. The business user uses the process recorder license to view, record, and submit a process using the Discovery Bot recorder.

Entitlement models

Two licensing models are available for Automation Anywhere Enterprise Version A2019:

File-based entitlements

When Version A2019 operates in a file-based entitlement mode:

- A license file is configured, generated, and installed for each Control Room.
- The Control Room administrator can then issue these licenses to specific user accounts.
- Each user consumes a license within a Control Room. If the same user is created in multiple Control Rooms, they will use up a license entitlement for each Automation Anywhere Enterprise Control Room.
- File-based entitlements only supports a floating user license model.

Cloud-based entitlements

Available and accessed from a cloud-based license server. Information exchanged between the Control Room and the license server meet GDPR compliance requirements. If you cannot allow access to an external service, such as the License Service, because of network or security

constraints, contact Automation Anywhere support.

- The cloud-based GUID can be installed only if there are no users file licenses in use.
- Administrators can reallocate user licenses after installing the cloud-based GUID.
- Cloud deployment supports multiple tenant environments where each tenant possesses a unique license.

RBAC on License Management

Access to License Management is deny-all and allow by exception based on roles and domains as defined in RBAC. Only those users who have access to License Management permission can view the entitlement details from the Automation Anywhere Enterprise Control Room.

Baseline inventory controls: Bot Creators, Bot Runners, and Bots

The Automation Anywhere Enterprise Control Room manages all automation operations. Inventory controls are maintained through the application of RBAC to establish a single point of control for Base Line Configurations (NIST CM-2), access restrictions for configuration management (NIST CM-5 and 6). Automated baseline reporting can be configured.

Product license permissions

This topic describes the available default product licenses.

Licenses are applied at the product level and the device level. At a minimum, apply the Enterprise Control Room product license to view the Enterprise Control Room. From that apply additional licenses to enable specific functions.

Licenses required	Privileges enabled
Enterprise Control Room product license and Bot Creator (Development) device license	Automate bots in Enterprise client. Issued as number of users.
IQ Bot product license and IQ Bot device license	Run IQ Bots within the parent TaskBots. The IQ Bot license number of users can be distributed between Unattended and Attended Bot Runners. For example, if you have 50 licenses, you can allot any number between 0-50 to Unattended or Attended Bot Runners. The total licenses distributed to Unattended and Attended Bot Runners cannot exceed 50.
Bot Insight product license	Bot Insight provides real-time, RPA native analytics for both business insights and operational intelligence. Bot Insight Analytics license is purchased on a per user basis.

Licenses required	Privileges enabled
Trial License	A trial license is shipped with validity of 30 days; on expiry of Trial licenses on page 388 the user must contact System Administrator or Automation Anywhere Sales to purchase a new license.

Accessing Enterprise A2019

Any new customer who orders Automation Anywhere Enterprise products are to receive license confirmation from Automation Anywhere.

The designated person responsible for configuring licenses for their company receives two email confirmations.

The SSO email from sso@automationanywhere.com grants you access to set up a new password for your Automation Anywhere Single Sign-On (SSO) account. The Orders email from orders@automationanywhere.com grants you access to your license entitlement information.

Do the following:

1. Open SSO email → access link.
2. Enter and confirm new password.
3. Access A-People Community.
4. There are two options to access your license entitlements.

Option	Action
A-People	Navigate to LICENSES.
Orders email	Access link to redirect to license page.



Note: Your license entitlement validation date is provided within the context of the Orders email and on the A-People License configuration page.

5. You now have access to your license entitlements.

On this page, you have access to more information of your order. The Product Versions shows your current license entitlement version, the License Entitlements shows the number of license entitlements in your order, and the Control Rooms shows the number of control rooms in your order, and allows to configure each licenses.

Configure new Enterprise Control Room licenses

The Enterprise Control Room in your order now requires configuration to generate and download new licenses.

The numbers of Enterprise Control Rooms are listed in the Control Rooms section. The status of current Enterprise Control Rooms are shown as:

- Available - Enterprise Control Room available for license configuration.
- Draft - Enterprise Control Room license configuration in progress.
- Pending Generation - Enterprise Control Room license generating in progress.
- Active - Enterprise Control Room available to view, download, and reconfigure.

Do the following:

1. Navigate to Control Rooms > CR-1.
2. Select CR-1 to configure new Enterprise Control Room license.



Note: The CR Name, Status, and Version fields are filled depending on your license.

3. Enter a Location value.
4. Select an Enviroment option.



Note: Depending on your use cases, your options are Production, Environment, or UAT.

5. Enter a number for Bot Runner Attended, Bot Runner Unattended, and Bot Creator.
6. Check Analytics > Bot Insight User (Analytical User) and enter the number of users.
7. Select Save & Generate.
8. Select Yes to confirm and generate new license.



Note: An email confirmation is sent for your newly generated license. The license page automatically refreshes and the CR-1 status now changes from Available to Pending Generation.

9. Select Refresh, the CR-1 status updates to Active.
10. Select CR-1 to view your generate Enterprise Control Room license information.
11. Select Download.



Note: The downloaded file is now installable to your development Enterprise Control Room environment.

12. Close CR-1 and repeat process on remaining CR files.

Reconfigure existing Enterprise Control Room licenses

The Enterprise Control Room license can be reconfigured and updated at anytime.

In cases where new license entitlements are added or mistakes were made, reconfiguring an existing Enterprise Control Room license is simple.

Do the following:

1. Navigate to Control Rooms > CR-1.
2. Select CR-1 to reconfigure existing Enterprise Control Room license.



Note: The CR Name will vary depending on user.

3. Select Reconfigure.
4. Select Yes to confirm reconfiguration.
5. Select Edit.
6. Update your values.



Note: The CR-1 status now displays Draft as file is in reconfiguration.

7. Update the Bot Runner Unattended number for newly added license entitlements.
8. Select Save & Generate.
9. Select Yes to confirm edits.



Note: An email confirmation is sent with a link to access A-People License and to download the generated license. The license page automatically refreshes and the CR-1 status now changes from Draft to Pending Generation.

10. Select Refresh, the CR-1 status updates to Active.
11. Select CR-1 to view your updated Enterprise Control Room license information.
12. Select Download.



Note: The downloaded file is the most recent Active. The downloaded file is now installable to your development Enterprise Control Room environment.

13. Close CR-1 and repeat process for any CR files needing reconfiguration.



Note: Administrators with a Cloud Control Room using a file license and wants to change to cloud license can manually disable all user licenses and then proceed to GUID installation, then reassign the user licenses.

Get started with Community Edition

Use these tasks to register for, and start creating and using bots with Automation Anywhere Community Edition A2019.

1. Register for the Automation Anywhere Community Edition:
 - a) From the Automation Anywhere website, <https://www.automationanywhere.com/>, scroll to and click the Get Community Edition option.
Alternatively, select Customers & Partners > A People Community > Community Edition. Scroll to the registration form: GET COMMUNITY TODAY.
 - b) Enter your identification information in the form that appears.
The form information includes your first name, last name, email, country, phone number, and company. This information is used to create your Community Edition user login credentials.

 Restriction: Only the period/dot (.) and at sign (@) are allowed in the email field. No other special characters are supported.
 - c) Read and agree to the terms, privacy policy, and license agreement. Select and click Submit.
Wait for the email from Automation Anywhere that contains the information for you to log in to the Community Edition. The email includes the Community Control Room URL, your username, and assigned user password. After you log in, you are prompted to reset your password.
To learn more, see [Training - Create bots without installation \(A-People login required\)](#). This course introduces you to learn how to download and register as a new Community Edition user.
2. [Log in to Automation Anywhere Enterprise Control Room](#) on page 398.
To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.
3. Install the Bot agent, register your device, and set user device credentials.
[Install Bot agent and register device](#) on page 400 | [Set user device credentials](#) on page 415
The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

To enable a device for running bots, set the local device credentials.

If you are using an operating system other than Windows, you will not be able to install the Bot agent at this time. See [system requirements](#). However, you can still build bots using the [Bot editor](#).

4. [Create your first bot](#) on page 418.

Follow these steps to create your first bot that prints the message, Go be great!, the Automation Anywhere version of Hello World!

5. [Run your first bot](#) on page 419.

Run a bot from the same device that you used to create the bot.

Watch the following videos that illustrate some of the steps in this task:

- Installing the Bot agent in Enterprise A2019:
- Building your first bot:
- Running your first bot in the Community Edition:

Community capacity and limitations

Community users access and bot creation and running conditions.

Number of bot creators per Community Edition user	Each Community Edition user can use one Bot Creator at a time.
Number of bots created by Community Edition user	Each Community Edition user can create multiple bots.
Number of registered devices per Community Edition user	Each Community Edition user can register multiple devices, but only be logged in to one at a time, and only run a bot on one device at a time.
Number of bots run by Community Edition user	Each Community Edition user can run one bot at a time on any one registered device.

Log in to Automation Anywhere Enterprise Control Room

To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.

Receive your registration confirmation email.

Enterprise A2019 users	This is sent by your system administrator.
Community Edition users	1. Register for the Community Edition. See Get started with Community Edition on page 397. 2. This is sent by Automation Anywhere using the information you provided when you registered.

This email contains:

- Enterprise Control Room URL.
- Username, credentials and provisioning tokens (where applicable).
- Temporary password. Reset this password when you login the first time.

1. Open the URL in your browser.

2. In the Log in form, enter your username and password.

If this is the first time you are logging in, use the password provided in your welcome email.

3. First-time users: Change your password, and for Cloud users, create your security questions.

The change password and create security questions form automatically opens when your log in for the first time. Complete the form.

a) Complete the Change password fields.

Type your current password. Then type the new password twice. Passwords are 8-15 characters long and can only contain the characters: a-z, A-Z, 0-9, at sign (@), dash (-), underscore (_), exclamation (!), pound (#), dollar (\$), percent (%), ampersand (&), and period (.).

b) For Cloud users: In each field pair of Question # and Answer, type a question and an answer that you will remember in the event your forget your password or need to confirm your login.

c) Click Save and log in.

After first login, to change password, click your username, select Change password, and complete the form.

4. Optional: Select Remember my username to quickly log in to the Cloud Control Room.

5. Optional: Click Forgot password? to reset your password.

An email is sent to you with a link to the necessary page to reset the account password.

6. Click Log in.

The credentials are authenticated directly with the Cloud Control Room or Community Control Room database.



Note: Your account is locked if you enter the wrong password a specific number of times depending on the password policy set by your administrator. For security reasons, failed log-in attempts are audited. This allows the administrator to analyze and take appropriate actions.

Related tasks

[Create your first bot](#) on page 418

Follow these steps to create your first bot that prints the message, Go be great!, the Automation Anywhere version of Hello World!

[Install Bot agent and register device](#) on page 400

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

[Reset user password](#) on page 1109

The Enterprise Control Room administrator generates an email process for the user to reset their password.

Install Bot agent and register device

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

Ensure the device system date and time are in sync with the current date and time so that the device registration is successful.

The Bot agent version available for download is the latest and compatible with the Enterprise Control Room version that is used.

After installation, the Bot agent is registered as a Windows service: Automation Anywhere Bot agent Service.



Note: At the row level, you can access actions such as view, edit, and delete depending on your permissions when you hover your mouse over the vertical ellipsis icon at the end of each item on the right.

1. Log in to the Enterprise Control Room through your Automation Anywhere Enterprise URL.
2. Install the Bot agent and add a local device by choosing one of the following options:
 - From the taskbar on the top-right of the screen, click the device icon and then click Add local device.
 - Go to the MY DEVICES page, and click the Add local bot agent icon located at the top-right of the Devices list.
3. Click Connect to my computer.
4. Follow the steps outlined in the wizard.

Authenticated proxy access: If your device's access to the internet is controlled through an authenticating proxy server, you are prompted to provide the proxy server authentication details. These credentials are required for the device to communicate with the Enterprise Control Room.

To enable the authenticated proxy, register the device through a Google Chrome browser with the Automation Anywhere Chrome extension enabled.

5. Select an option to install the Bot agent either at the system level or user level.
 - To install at the system level, select Anyone who uses this computer (all users)
All users of the device will be available as Bot agent. However all the users must have administrator privileges.
 - To install at the user level, select Only for me (username).
Only the selected user will be available as Bot agent.
6. Enter the following in the Additional information screen:
 - Device nickname (optional)
 - Device type (single user or multi-user)



Note: In case of a multi-user device, enter the number of concurrent sessions that will be allowed.

7. Click Save.
8. Refresh the My Devices page and verify that the local device is added.

You can identify the devices by their IP address and hostname.

If you face any issues registering your device, see [A2019: Error while registering device - An unexpected problem occurred \(A-People login required\)](#).

If the Bot agent service is paused and does not start after installation, see [Automation Anywhere Bot Agent service goes to Paused state and cannot be started \(A-People login required\)](#)

To learn more, search for the Did You Know that Bot Runners and Control Room can now Communicate without Human Intervention? (A2019) course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#). This course demonstrates how to register devices in the Enterprise Control Room.

Watch the following video on how to install the Bot agent in Enterprise A2019:

[Set user device credentials](#) on page 415. Optionally, [Edit profile](#) on page 389.

If your device is set with a proxy, see the following tasks that apply to your proxy settings:

- [Connect Bot agent to a device with a proxy](#) on page 415
- [Connect Bot agent to a device with a proxy using a script](#) on page 416

Related concepts

[About device pools](#) on page 1073

Device pools are a logical grouping of devices or similar Bot Runner machines on which you can run your workload management automations or scheduled automations. For example, you can group devices of a specific department or unit and create a device pool for it.

Related tasks

[Create device pools](#) on page 1074

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

About the Bot agent

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. After installing the Bot agent on a device, a registered user with role-based access privileges can create, manage, and deploy bots on that device.

Bot agent configuration

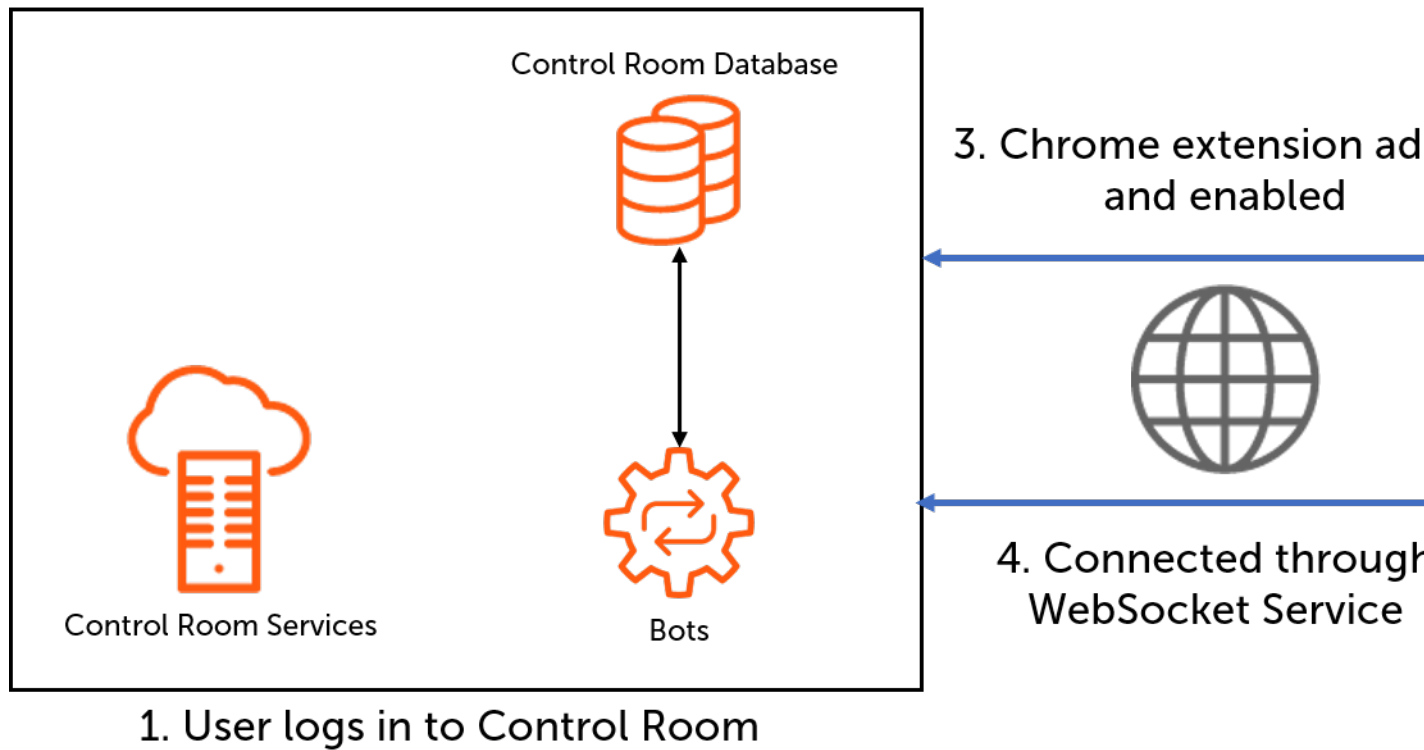
1. A user can log in to the Enterprise Control Room using the credentials provided by the administrator after the Enterprise Control Room administrator creates a user and shares the credentials with the user.
2. The user can now install the Bot agent and the user device is registered and mapped to that username in the Enterprise Control Room.



Note: The Bot agent can be registered as a user in the Enterprise Control Room only with Google Chrome browser. However, a user can use all supported browsers (including Google Chrome) to create, edit, and deploy bots.

3. The Bot agent is registered as a Windows service (Automation Anywhere Bot agent Service) on the user device and the Automation Anywhere extension is added to the user's Google Chrome browser.

4. The device communicates with the Enterprise Control Room using WebSocket and stays connected.



Privilege mapping

A user is granted privileges governed by role-based access and assigned a device license by the Enterprise Control Room administrator. The user is allocated either a Bot Creator or Bot Runner license.

Bot Creator

Users with Bot Creator licenses can log in to the Enterprise Control Room from a browser to perform the following actions:

- Create, edit, or delete bots.
- Manage bots for using in Bot Insight, IQ Bot, and Bot Store.

Bot Runner

Users with Bot Runner licenses are used to deploy bots from the Enterprise Control Room.

A user can be allocated any one of the two licenses - Unattended or Attended Bot Runner license.

- Users with unattended Bot Runner license are configured to allow other Enterprise Control Room users with required privileges to run and schedule automation from the Enterprise Control Room. Such users are also referred as Run as users.
- Users with attended Bot Runner license are allowed to run attended automations on their own devices from the Enterprise Control Room.

Bot agent compatibility

Bot agent is the Automation Anywhere Enterprise plug-in that enables you to create and run bots. The agent is installed on devices used to access the Enterprise Control Room. Installing the Bot agent is part of registering a device.



Note: The Bot agent version that is available for download is the latest and compatible with the Enterprise Control Room version that is used.

- [Compatibility with Enterprise A2019 builds](#)
- [Hardware requirements](#)
- [Device compatibility](#)
- [Operating system compatibility](#)
- [Browser compatibility](#) on page 407
- [Auto login support](#) on page 407

Compatibility with Enterprise A2019 builds



Note: The Bot agent version that is available for download is the latest and compatible with the Enterprise Control Room version that is used.

Enterprise A2019 version	Enterprise A2019 build	Bot agent version
Enterprise A2019.19	Build 8098 (On-Premises and Community Edition)	18.19.8776
Enterprise A2019.18	Build 7560 (Cloud, On-Premises, and Community Edition)	16.19.8238
Enterprise A2019.17	Build 7103 (Cloud, On-Premises, and Community Edition)	16.7.7774
Enterprise A2019.16	Build 6463 (Cloud, On-Premises, and Community Edition)	14.3.7141
Enterprise A2019.15	Build 5933 (Cloud, On-Premises, and Community Edition)	12.7.6609
Enterprise A2019.14	Build 5322 (Cloud, On-Premises, and Community Edition)	12.1.6000
Enterprise A2019.13	• Build 4705 (On-Premises) • Build 4701 (Cloud and Community Edition)	• 9.0.5383 • 9.0.5379
Enterprise A2019.12	• Build 4111 (Cloud and Community Edition) • Build 4105 (On-Premises)	• 7.0.4789 • 7.0.4783

Enterprise A2019 version	Enterprise A2019 build	Bot agent version
Enterprise A2019.11	Build 3337 (On-Premises, Cloud, and Community Edition)	6.0.4015
Enterprise A2019.10	Build 2545 (Cloud, On-Premises, and Community Edition)	3.3.3211
Enterprise A2019.09	Build 2094 (Cloud, On-Premises, and Community Edition)	3.0.2772
Enterprise A2019.08	• Build 1610 (On-Premises only) • Build 1598 (Cloud and Community Edition)	• 1.0.2288 • 1.0.2276
Enterprise A2019.07	• Build 1089 (On-Premises only) • Build 1082 (Cloud and Community Edition)	• 1.0.1767 • 1.0.1760
Enterprise A2019.06	Build 543 (Cloud, On-Premises, and Community Edition)	1.0.1221
Enterprise A2019.05	Build 336 (Cloud, On-Premises, and Community Edition)	1.0.1014

Hardware requirements

You can install the Bot agent on devices that meet the following hardware requirements.

Device	Processor	RAM	Storage (free disk space)	Network
Machine	Intel Core i3 2.6 GHz with 4 multi-cores or higher 64-bit	• 4 GB (Minimum) • 8 GB (Recommended)	32 GB Add 100 through 150 KB per Automation Anywhere script Add 40 through 50 GB per long-term project	• 5Mbps (Minimum) • 20Mbps or higher (Recommended)

Additional RAM requirements for the registered devices

Add additional RAM to account for applications and services running on the registered devices, for example:

- Microsoft Office applications (example: Excel)
- Browsers (example: Google Chrome)

- Enterprise applications (example: CRM, Oracle EBS, and SAP)
- VDI infrastructure applications
- Anti-virus software

Additional disk space on registered devices

- Automation Anywhere Enterprise scripts average approximately 100-150 KB. Additional free disk space is required to develop automation projects because temporary files such as screenshots, server logs, and audit files are created during the execution of the automation scripts.
- Free space required increases with the project size. Recommendation: Have at least 40-50 GB of free disk space for each long-term project.
- Increase storage space configuration after installation, as needed, depending on product usage. For example, depending upon the complexity of your bot, generating log files and logic creation require additional disk space later.

Device compatibility

A device running the Bot agent to perform automation must meet the following requirements:



Note: Device requirements are different for the Enterprise Control Room and Bot agent. For Enterprise Control Room compatibility, see [Operating system, environment, and platform supported for Enterprise Control Room](#) on page 295

On-Premises machines	Physical machines running any of the supported operating systems.
Terminal servers	Remote desktop (RDP) running on supported operating systems from Enterprise A2019.11 or later.
Virtual machines	From Enterprise A2019.09 or later, the Bot agent can be installed on all virtual machines (VMs) with supported Windows OS. The Bot agent is certified to support: • Amazon Web Services EC2 on Windows 10, Windows 2012, Windows 2016, and Windows 2019 • Amazon Web Services WorkSpaces on Windows 10 • Google Compute Engine on Windows 2012, Windows 2016, and Windows 2019 • Microsoft Azure on Windows 10 Pro • VMware VMs on ESXi 6.7 • Oracle Virtual Box version 6.1 • Citrix XenDesktop • Citrix VDI Windows 2016

- Windows 10 Enterprise on Citrix



Recommendation: When you install the Bot agent on virtual machines, ensure that you change the virtual machine Power and Sleep settings to Never so that bot deployments from the Enterprise Control Room can run without interruption.

Operating system compatibility

You can install the Bot agent on machines running the following operating systems.

This compatibility applies to On-Premises and Cloud deployments, and the Community Edition of Enterprise A2019.



Note:

- Only 64-bit operating system version supported.
- Bot Creator tasks are supported with all the listed operating systems.
- You cannot register a device that is running on a Linux system. The Bot agent cannot be installed on Linux systems. However, you can use a registered device running on a Windows system to access an Enterprise Control Room that is installed on a Linux system.

Windows version	Windows edition	Attended Bot Runner	Unattended Bot Runner	Bot Creator
Windows Server 2019	Datacenter	Supported	Supported ¹	Supported
Windows Server 2016	Datacenter	Supported	Supported ¹	Supported
Windows Server 2012	Standard	Supported	Supported ¹	Supported
Windows 10	Professional and Enterprise	Supported	Supported ¹	Supported
Windows 8 ²	Professional and Enterprise	Supported	Supported	Supported
Windows 7 ²	Professional and Enterprise	Supported	Supported	Supported

(1) Auto-login

- Auto-login is only supported on 64-bit systems.
- If the Auto-login fails, configure the Local Security Policy settings. For example, in Windows, select Security Settings > Local Policies > Security Options. Enable the Interactive logon: Do not require CTRL+ALT+DEL option.

(2) Supported OS

Windows 8 supported on Enterprise A2019 Builds 1598 and 1610 or earlier.

Windows 7 supported on Enterprise A2019.12 or later.

Browser compatibility

The user interface for Automation Anywhere Enterprise is through a browser. Log in to your device, and then log in to Enterprise Control Room through the browser.

Browser	Browser version
Google Chrome*	57 or later
Microsoft Internet Explorer	11
Microsoft Edge based on Chromium	79 or later

(*) Google Chrome extension: To run a bot that contains actions from the Recorder package, you must enable the Google Chrome extension that corresponds with the Recorder package version. See [Google Chrome browser extension requirements](#) on page 308.

Auto login support

The following table identifies the OS support specific to the auto login functionality on Bot agent.

SID#	Scenario	Windows 2019	Windows 2016 R2	Windows 2012 R2	Windows 10	Windows 8	Windows 7
1	No user session established (user is not logged in)	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device and virtual machines only	Not certified	Not certified
2	User session established	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device and virtual machines only	Not certified	Not certified
3	User has logged in but locked the screen	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device and virtual machines only	Not certified	Not certified

SID#	Scenario	Windows 2019	Windows 2016 R2	Windows 2012 R2	Windows 10	Windows 8	Windows 7
4	A different user (not the device login user used for deployment) is logged in	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device machines and virtual machines only	Not certified	Not certified
5	A different user is logged in and locked the screen	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device machines and virtual machines only	Not certified	Not certified
6	Fast user switching	Not applicable for virtual machines	Not applicable for virtual machines	Not applicable for virtual machines	Supported on local Windows 10 device machines and virtual machines only	Not certified	Not certified
7	No active RDP session	Supported	Supported	Supported	Supported	Supported	Supported
8	User has active RDP session	Supported	Supported	Supported	Supported	Supported	Supported
9	User's RDP session is disconnected	Supported	Supported	Supported	Supported	Supported	Supported
10	User's RDP session is locked	Supported	Supported	Supported	Supported	Supported	Supported
11	Another user has active RDP session	Supported	Supported	Supported	Supported	Supported	Supported
12	Another user has a disconnected session	Supported	Supported	Supported	Supported	Supported	Supported
13	Another user has an active session and locked	Supported	Supported	Supported	Supported	Supported	Supported



Note:

1. Auto login is only supported on 64 bit systems.
2. Auto-login is unable to sign-out the root Admin session, when trying with scenarios that involve 2 different auto-login users. Remember to log out of the admin user account before deploying a bot.
3. For scenarios 4,5, and 6 in the above table, the active user is logged off and a new session created with device credentials for deploying the bot.

4. Set the Local Security Policy. If the Auto-login fails, configure the Local Security Policy settings. For example, from Windows, select Security Settings > Local Policies > Security Options. Enable the Interactive logon: CTRL+ALT+DEL option.

Related reference

[Enterprise A2019 feature comparison matrix](#) on page 224

Use the feature comparison matrix to compare the Enterprise A2019 features with the features in Automation Anywhere Enterprise 11.3.x and 10.x versions.

Working with the Bot agent

Users can perform tasks based on their access privileges after installing the Bot agent on their device.

Install and update the Bot agent

If you are using the Bot agent application for the first time, you must perform these tasks:

1. Verify all prerequisites to install the Bot agent are complete.

[Bot agent compatibility](#) on page 403

2. Install the Bot agent on your device.

[Install Bot agent and register device](#) on page 400 | [Perform silent installation of Bot agent on temporary devices](#) on page 410

Connect the Bot agent to your device using an authentication proxy to ensure changed proxy setting or credentials are updated so that bots can be deployed on your device.

[Connect Bot agent to a device with a proxy](#) on page 415 | [Connect Bot agent to a device with a proxy using a script](#) on page 416

3. Set device credentials to enable the Enterprise Control Room to deploy bots on your device.

[Set user device credentials](#) on page 415

4. Switch to a different Enterprise Control Room based on your automation requirements.

[Switch Bot agent to a different Enterprise Control Room](#) on page 414

5. When updates are available, you can update the Bot agent to the latest version.

Depending on the settings for the Bot agent, you can either automatically update or manually update your Bot agent.

[Automatically update the Bot agent](#) on page 412 | [Manually update the Bot agent](#) on page 413

Related tasks

Users can also perform the following tasks:

- Use the Bot agent diagnostic utility to perform diagnostic checks on Bot Runner devices and to help in resolution of Bot agent connectivity challenges.

[Perform Bot agent diagnostic checks](#) on page 416

- Use the Bot agent relevant logs to resolve issues.

[Bot agent log files](#) on page 1054

- View the Bot agent performance data for analysis.
[Bot agent status processing](#) on page 290
- Create and edit TaskBots
[Create your first bot](#) on page 418 | [Editing bots](#) on page 860
- Deploy bots on attended and unattended Bot Runners with or without Workload automation.
[Run a bot](#) on page 856 | [Schedule a bot](#) on page 1058 | [Run bot with queue](#) on page 1085
- Manage different bots and packages using Bot Store, Bot Insight, and IQ Bot.
[Bot Store](#) on page 1154 | [Using Bot Insight](#) on page 1330 | [Get started with IQ Bot](#) on page 428
- Perform other activities such as updating user profile.
[Edit profile](#) on page 389



Resources: For additional information about the Bot agent, see this training course: [RPA Certification Online Courses \(A-People login required\)](#)

Perform silent installation of Bot agent on temporary devices

Edit the Bot agent MSI file to silently install the Bot agent on temporary devices or non-persistent virtual desktop infrastructure (VDI) in the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task.

Ensure the following requirements are completed:

- Bot agent setup and MSI files are downloaded from the Enterprise Control Room and the parameters required to install temporary devices are available in the Bot agent MSI file.
If you are not able to access the MSI files, contact support on <https://www.automationanywhere.com>.
- Windows 10 Software Development Kit including Orca and Enterprise Control Room are installed on your device.

You can install Orca from `C:\Program Files (x86)\Windows Kits\10\bin\10.0.18362.0\x86\Orca-x86_en-us.msi`.

1. Navigate to the Enterprise Control Room.
2. Download the Bot agent setup file.
3. Navigate to `<application filepath>\crui\asset`.
For example: `C:\Program Files\Automation Anywhere\Enterprise\crui\asset`
4. Edit the `AutomationAnywhereBotAgent.msi` file using the Orca tool.
5. Click the Property option.
6. Enter appropriate values for the following parameters:

Parameter	Description
AA_CRTOKEN	Enter the registration key that is used to install the Bot agent on multiple devices at a time in bulk.
AA_CRURL	Enter the Enterprise Control Room instance to which the Bot agent will to be connected.

Parameter	Description
AA_DEVICE_TYPE	Enter one of the following values for the device type: • Single user • Multiple users
AA_LIFESPAN	Enter one of the following values for a non-persistent or persistent device: • Temporary • Persistent
AA_CONCURRENT_SESSIONS	Enter the concurrent sessions allowed, from 1 through 99. The default value is 1.
AA_INSTALL_ONLY	Choose whether you want to install the Bot agent without registering with the Enterprise Control Room. • Enter <code>True</code> to only install and not register the Bot agent. • Enter <code>False</code> to install and register the Bot agent.
AA_DEVICE_POOL_NAME	Enter a value to accept the device pool name and add the device to the device pool. The default value is 0.

7. Save the changes.
8. Copy the `AutomationAnywhereBotAgent.msi` file to the VM instance (golden image) on which you want to install the Bot agent.
9. Run the `AutomationAnywhereBotAgent.msi` file.
10. Validate that the Bot agent is installed on the VM instance and Bot agent service is not running in the Task Manager Services tab.

To deploy the Bot agent on temporary devices, you must configure the SysPrep settings and create machine images on the VM instance.

11. Shut down the VM instance without SysPrep after you enable temporary or non-persistent computer name settings for the VM.
For an example of how to use SysPrep on AWS EC2 instance, see [Use Sysprep to create and install custom reusable Windows AMIs](#).
12. Create machine images on the VM instance as required.
For an example of how to create Amazon Machine Images (AMI) from an AWS EC2 instance, see [Create an AMI from an Amazon EC2 Instance](#).

If a Bot agent is registered in the VM instance by mistake, perform these steps to restore the machine image:

1. Uninstall the Bot agent from the Windows Control Panel of the VM instance.
2. Delete all files from `C:\Windows\System32\config\systemprofile\AppData\Local\AutomationAnywhere`.

3. Enter `True` for the `AA_INSTALL_ONLY` parameter in the `AutomationAnywhereBotAgent.msi` file that you previously used to install the Bot agent.

Validate that the devices are added as temporary devices on the Enterprise Control Room Devices page.

[Devices](#) on page 1067

Related tasks

[Configure auto-delete temporary device settings](#) on page 1133

Configure your device settings to automatically delete a temporary device when the device is disconnected from the Enterprise Control Room after a certain time interval.

Automatically update the Bot agent

An Enterprise Control Room administrator can choose to automatically update the Bot agent to a later version using the auto-update capability. This reduces the downtime because each user is not required to log in to the Enterprise Control Room to update the Bot agent installed on the user device.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Ensure the following:

- The Bot agent version is 12.1.6000 or later.
- The Automatically update all bot agents option is enabled in the Enterprise Control Room.
- All user devices are connected to the Enterprise Control Room.
- The Enterprise Control Room self-signed certificate is imported to the Java Credential Store on the user machine when the Bot agent is installed for the first time.

The option defaults to auto-update based on the Enterprise A2019 deployment you use.

- Auto-update is enabled by default for the Enterprise A2019 Cloud and Community Edition users.
- Manual update is enabled by default for the On-Premises users.

1. Navigate to Administration > Settings > Devices.
2. Select Bot-agent software settings.
3. Click Edit.
4. Select one of these options:

Option	Description
Automatically update all bot agents	This option notifies the Enterprise Control Room whether the Bot agent requires an update and automatically updates the Bot agent when the user device is connected. During the update, new deployments to that device are queued.

Option	Description
Manually update bot agents	The Bot agent has to be manually updated when an update is available. The manual update can be done for a single device or a group of devices.  Note: Each user has to log in to the Enterprise Control Room to update the Bot agent installed on the user's device.

- Click Save changes.

Related tasks

[Manually update the Bot agent](#) on page 413

The Bot agent, a lightweight application that enables you to run bots on your device, requires an update when a new version becomes available.

Related reference

[Devices](#) on page 1067

The device is a machine through which a user connects to the Enterprise Control Room to create or run bots. Manage devices that are registered to the Enterprise Control Room through the My devices page located in the DEVICES tab.

Manually update the Bot agent

The Bot agent, a lightweight application that enables you to run bots on your device, requires an update when a new version becomes available.

The Bot agent version available for download is the latest and compatible with the Enterprise Control Room version that is used.

- Log in to the Enterprise Control Room through your Automation Anywhere Enterprise URL.
- Navigate to MY DEVICES.

On the My Devices page, the device status indicates whether the Bot agent requires an update. The arrow color on the device icon indicates the status:

- Red—update required
- Blue—update available, but not required
- Green—current version, no update required

Alternatively, for your local device only, if the status icon indicates an update, click the device icon in the header.

- From the device icon, click Add local bot agent.
- Click Connect to my computer.
- Click the Manually download the latest version link.
This option appears only if you have an existing Bot agent installed.
- When the `AutomationAnywhereBotAgent.exe` completes its download, click Next.

The following message is displayed: **Connected to your computer. Your local bot agent has been successfully installed configured.**



Note: You can also update a single device with row-level actions.

Watch the following video on how to update the Bot agent in Enterprise A2019:

If you see the following message displayed: Device is disconnected or needs upgrade!, see [Error : Device is disconnected or needs upgrade \(A-People login required\)](#)

Related tasks

[Automatically update the Bot agent](#) on page 412

An Enterprise Control Room administrator can choose to automatically update the Bot agent to a later version using the auto-update capability. This reduces the downtime because each user is not required to log in to the Enterprise Control Room to update the Bot agent installed on the user device.

Related reference

[Devices](#) on page 1067

The device is a machine through which a user connects to the Enterprise Control Room to create or run bots. Manage devices that are registered to the Enterprise Control Room through the My devices page located in the DEVICES tab.

Switch Bot agent to a different Enterprise Control Room

Switch the Bot agent on a registered device to work with a different Enterprise Control Room.

Ensure that you have the proper permissions to access and edit the Windows services.

The Bot agent, a lightweight application that enables you to run bots on your device, is associated with an Enterprise Control Room. This task provides steps on how to associate your device with a different Enterprise Control Room.

1. Stop the Bot agent service from the local Windows Task Manager.
2. Optional: Go to the `C:\Windows\System32\config\systemprofile\AppData\Local\AutomationAnywhere` folder and delete the **registration.properties** file.



Note: This is only required if you want to register the device in a different Enterprise Control Room environment. To see the Enterprise Control Room where the device is registered, open the `Registration.properties` file and check the value for the Enterprise Control Room URL.

3. Log in to the Enterprise Control Room.
4. Navigate to Devices > My devices.
5. Click the Add local device icon.
6. Download and install the latest Bot agent.
7. Return to Devices > My devices from the updated device.
The `Registration.properties` file is not generated immediately after the Bot agent installation. It is generated only when a user accesses an Enterprise Control Room URL from that device. If the device registration is successful, the machine appears as Connected and the `Registration.properties` file is created at the given location on the Bot Runner machine.
8. Navigate to the `C:\Windows\System32\config\systemprofile\AppData\Local\AutomationAnywhere` folder and ensure that the `registration.properties` file is present to verify the Bot agent update.

Watch the following video on how to update your Bot agent:

Related tasks

[Install Bot agent and register device](#) on page 400

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

Set user device credentials

To enable a device for running bots, set the local device credentials.

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices. Add the local device before editing the credentials. See [Install Bot agent and register device](#) on page 400.

For Automation Anywhere Enterprise Community Edition users, your profile contains only one set of credentials at a time. These credentials are applied to any device you select to run your bots. Ensure each device that you use accepts the credentials in your profile.

Automation Anywhere Enterprise Cloud users have the option to apply different credentials to registered devices.

1. Click the Device icon and select Update credentials.
2. In the Device login credentials section, enter the Username and Password for the device.

Device login credentials are required to run a bot from this device.



Note: Enterprise A2019 does not validate the device login credentials until you run a bot.

If your username is part of a domain, include the domain within the format `domain\username`. Typically, home users are not part of a domain, unless they are specifically configured.

If your username contains non-ASCII characters, ensure your system locale settings are configured to use these characters.

[Configuring post-installation settings](#) on page 371

3. Click Update.

[Create your first bot](#) on page 418

Connect Bot agent to a device with a proxy

If your Bot agent cannot connect to the Enterprise Control Room due to proxy settings, complete the steps in this task to add the authentication details.

Typically, when you change your proxy settings, whether you added a proxy or changed the credentials to the authenticating proxy, the Bot agent prompts for the new credentials.

If you have to manually add or update the authenticating proxy credentials, complete the following steps:

1. Open the Microsoft command prompt in administrator mode.
2. List the proxy status by running the command: `netsh winhttp show proxy`
3. If the command returns `Direct access`, then run the command: `netsh winhttp import proxy source = ie`
4. Restart the Bot agent.
5. Open a Google Chrome browser with the Automation Anywhere extension enabled.
6. Log out and log back in to the Enterprise Control Room.

If prompted, provide the proxy credentials.

7. From the Enterprise Control Room, check the device status and verify that it is connected.

Connect Bot agent to a device with a proxy using a script

If your device cannot connect to the Enterprise Control Room because the device proxy setting is configured to use an automatic configuration script, complete the steps in this task to run the script to provide the authentication details.

You can perform these steps before or after installing the Bot agent.

To add or update the proxy, perform the following steps:

1. Download PSTools.
[PsExec](#)
2. Extract the files from downloaded zip file.
3. Open the Microsoft command prompt in administrator mode.
4. Change to the directory where you extracted the PSTools files.
5. Execute the following command:

```
.\psexec -i -s -d cmd
```

6. In the new command prompt window, execute the following command:

```
whoami
```

The system returns the following:

```
nt authority\system
```

7. Execute the following command:

```
inetcpl.cpl
```

8. In the Internet Properties, navigate to Connections > LAN settings.
9. Select the Use automatic configuration script option.
10. Provide the address to the proxy auto-configuration (PAC) file.
For example: `http://localhost:888/proxy.pac`.
11. Click OK.
12. Restart the Bot agent in Windows Services.
13. From the Enterprise Control Room, check the device status and verify that it is connected.

Perform Bot agent diagnostic checks

Use the Bot agent diagnostic utility to perform diagnostic checks on Bot Runner devices and to help resolve Bot agent connectivity issues.

Ensure the Bot agent is installed on the user device.

1. Open the Windows command prompt.
2. Navigate to `C:\Program Files\Automation Anywhere\Bot Agent`.
3. Enter `AADiagnosticUtility.exe` to run the Bot agent diagnostic utility.
Various options to perform the diagnostic check are displayed with their descriptions.

Option	Description
<code>-checkProxy <CR_URL></code>	Check the proxy settings on the device.
<code>-configProxy <CR_URL></code>	Check proxy configuration and configure proxy credentials, if required.
<code>-importProxy <CR_URL></code>	Import the proxy settings from a logged-in user device to the system user device. You must have administrator permission to import proxy settings.
<code>-checkWSError <CR_URL></code>	Check for WebSocket connectivity and errors. Error messages are maintained in the device memory and are removed when the Bot agent service is restarted.
<code>-importSSLCertificate path_to_ssl_certificate</code>	Import a SSL certificate into the Java credential store, if required. You must have administrator permission to import the SSL certificate.
<code>-validateSSLCertificate <CR_URL></code>	Check for a valid SSL certificate and view whether the certificate is valid or invalid. You must have read permission to perform this check.
<code>-ping <CR_URL></code>	Check connectivity between the Enterprise Control Room and Bot Runner devices.
<code>-list</code>	View active bot deployments on the local devices.
<code>-checkDownloadError <CR_URL></code>	Check for bot dependency download errors if the bot deployment fails. Error messages are maintained in the device memory and are removed when the Bot agent service is restarted.

- Enter the following option in the command prompt: `<filepath>\AADiagnosticUtility.exe -<option> <CR_URL>`
For example, to verify WebSocket errors, enter the following in the command prompt:
`AADiagnosticUtility.exe -checkWSError https://yourcrurl.com/`
The option returns the following result: Recently this device has not encountered any Web Socket errors

Use the other options to perform further diagnostic checks.

Create your first bot

Follow these steps to create your first bot that prints the message, `Go be great!`, the Automation Anywhere version of `Hello World!`

This task is performed by the user who wants to build and deploy bots. You must have the necessary rights and permissions to complete this task, and authorization to log in to the Enterprise Control Room as the licensed user.

Log in to your instance of the Automation Anywhere Enterprise Community Control Room or Cloud Control Room.



Note: These steps describe the guided workflow for first time users. The guided workflow is only displayed the very first time you complete these steps.

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location `\Bots\`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
- 

Important: When creating a bot, ensure that your bot name does not include the following special characters: forward slash (/), backslash (/), question mark (?), pipe (|), asterisk (*), lesser than sign (<), greater than sign (>), double quotation marks ("), comma (,), left or right braces ({}), left or right brackets ([]), plus sign (+), and percentage sign (%).
2. Insert a [Message box package](#) on page 694 action.
 - a) Click Actions.
 - b) Search for the Message Box package.
Click in the Actions search box and type the word, `message`. Click the arrow to expand the Message Box options.
 - c) Double-click or drag the Message Box action to the Bot editor (open space to the right).
A dialog box to configure the action opens.
 3. Specify the conditions for the Message Box action.
 - a) In the Enter the message box window title field, type `My first bot!`.
 - b) In the Enter the message to display field, type `Go be great!`.
 - c) Accept the defaults in the Scrollbar after lines field and Close message box after check box.
 4. Click Save.
Your bot is now ready to run.

1. Click through the Bot editor options for viewing and editing bots:
They are located at the top of the Bot editor.
 - Flow: Graphical representation of the process (default).
 - List: Sequential entries for each action.



Note: Drag the selected action within the task logic.

- Dual: Split screen of the Flow and List views.
2. Run your bot from your Automation Anywhere Enterprise device. See [Run your first bot](#) on page 419.

Run your first bot

Run a bot from the same device that you used to create the bot.

Log in to your instance of the Automation Anywhere Enterprise Community Control Room or Enterprise Control Room.

Complete these previous steps:

1. [Install Bot agent and register device](#) on page 400
2. [Set user device credentials](#) on page 415
3. [Create your first bot](#) on page 418

These steps describe the guided workflow for first-time users. The guided workflow is only displayed the very first time you complete these steps.

You can run a bot from the following devices:

- The same device you are using to log in to the Community Control Room or Enterprise Control Room.
- Another device you registered that has the same login credentials as the machine you are using to log in to your Community Control Room or a device with defined credentials in the Enterprise Control Room.



Note: Windows NT LAN Manager (NTLM) is a challenge or response authentication method that enables clients to provide their user name and password as encrypted credentials or plain text. Use Google Chrome browser to enable the Automation Anywhere extension and capture the proxy information. After the proxy information is captured, you can use any browser to run a bot in Enterprise A2019.

1. Locate and select your bot.
From your Community Control Room or Enterprise Control Room dashboard, select BOTS > My Bots.
2. Select the bot to run.
From the Files and folders table, mouse over the ellipsis (three stacked dots) to the right of your bot's name.
The Edit TaskBot panel appears.
3. Click the Run Task bot icon.
The Run bot now window opens. In the Task Bots table, your bot is selected to run.
4. Click Next.
The Device tab opens with a table of one or more registered devices.
5. If your device is not already selected, select your device to run the bot, and click the right arrow.
6. Click Run bot now.

Automation Anywhere Enterprise uses the credentials in your profile to log in to the device you selected and runs the bot.

The In progress activity window opens with the status of the running bot. When the bot is done, it disappears from this window.

7. Click Historical to see if your bot ran successfully.

Watch the following video on how to run your first bot in the Community Edition:

Build bots using variables, actions, and the Universal Recorder. See [Get started building bots](#) on page 885.

Update to latest Enterprise A2019 version

If you are already using Enterprise A2019 On-Premises, you can update to the latest version of Enterprise A2019.

Back up your database, repository, and installation configuration files.



Important: When you update from an earlier Enterprise A2019 version to the latest Enterprise A2019 version (for example, Enterprise A2019.16), you might see an Elasticsearch Open Distro error message. Before upgrading, delete the multiple application_log indices from Elasticsearch, which will free up disk space for the update.

- For details on how to delete the application_log indices, see [How to delete application_logs_* indices from Elasticsearch in A2019 \(A-People login required\)](#).
- For details on the Elasticsearch indices limit, see [Cluster-level shard allocation and routing settings](#).

1. Log in to Automation Anywhere Support site to download the latest version of the Enterprise A2019 setup file.
A-People Downloads page (Login required)
2. On the Downloads page, click the link to the latest Automation Anywhere Enterprise A2019 setup file.
3. Click **Installation Setup**, and then click either **Linux Setup** or **Windows Setup** based on the operating system of the machine on which you want to install Enterprise A2019.
4. Download the `AutomationAnywhereEnterprise_A2019.<file-extension>` file.
5. Install the latest version of Enterprise A2019 without uninstalling the current version of Enterprise A2019.

[Installing Enterprise Control Room On-Premises](#) on page 284



Important: You must use the SQL database of the current version in the newer version of Enterprise A2019.

Related concepts

[Migrate to Enterprise A2019](#) on page 430

Migrate to the latest Enterprise A2019 version from Automation Anywhere Enterprise versions 11.x or 10.x.

Update Enterprise A2019 on Microsoft Windows Server using scripts

Update Enterprise A2019 using a customized script with parameters to maintain existing user configurations.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task.

- Verify [Enterprise A2019 On-Premises prerequisites](#) on page 286.
- Ensure that you have the following:
 - Automation Anywhere Enterprise Control Room installation file
 - SSL certificate
 - License file

Create and execute a PowerShell script to update Enterprise A2019.

1. Create a PowerShell script with the required parameters:

The following is a sample PowerShell script for upgrading Enterprise A2019:

```
# Script Begins
# It fetches Data from config.properties file present under the same
  directory level

$PropertyFilePath = 'C:\script\config.properties'
$rawProperties = cat $PropertyFilePath
$propertiesToConvert = ($rawProperties -replace '\\', '\\') -join
[Environment]:: NewLine;
$properties=ConvertFrom-StringData $propertiesToConvert
$env:SEE_MASK_NOZONECHECKS = 1

# Setting up the logger and InstallerRoot Directory

$baseLogFilePath=$properties.baseLoggingDirectory
$logFilePath=$baseLogFilePath+'Express_CR_Installation_Scenario1.txt'
$baseInstallerPath=$properties.baseInstallerDirectory
$installer_name_regex=$properties.installerNameRegex

# Logging Begins

Start-Transcript -Path $logFilePath -Append -IncludeInvocationHeader

$binary = Get-ChildItem $baseInstallerPath | Where-Object { $_.FullName -
  imatch $installer_name_regex }
$a = $binary.FullName
$final_commandline = " /update /s /v/qn /v""/L*v
  CR_Onprem_Installationlog_Scenario1.txt""

# Recording the Start Time
Get-Date -Format g

# Invoking the Installer here
$processdetail = (Start-Process -FilePath $a -ArgumentList
  $final_commandline -Wait -Passthru).ExitCode

# Recording the End Time
```

```
Get-Date -Format g
```

```
Stop-Transcript
```

2. Optional: Customize the script to include parameters according to your requirements.
3. Save the script to the installation server.
4. Log in to the installation server as administrator.
5. Start PowerShell in administrator mode.
6. Execute the following:

```
Set-ExecutionPolicy Unrestricted -Scope CurrentUser -Force
.\install.ps1
```



Note: The silent installation logs are stored in the folder from which the installation script is executed. For example, if you run the script from C:\Silent Install, the logs are stored in the C:\Silent Install folder.

7. Validate the following:
 - All Automation Anywhere services are running in Windows Task Manager.
[Verifying Automation Anywhere services](#) on page 372
 - You are able to log in to the Enterprise Control Room from a supported browser.
[Log in to Automation Anywhere Enterprise Control Room](#) on page 398
 - You are able to install the required license in the Enterprise Control Room.
[Installing additional licenses](#) on page 1145
 - All automations (deployed and scheduled) are running in the Enterprise Control Room.
[Activity](#) on page 1056

Install and update IQ Bot A2019

This collection of topics guide you through the process of installing or setting up IQ Bot A2019 Community Edition, On-Premises, and Cloud.

- System prerequisites
Review the operating system and database compatibility, database information, and the hardware and software requirements for IQ Bot A2019.
[IQ Bot system requirements](#) on page 424.
- Install IQ Bot A2019
If you are new to IQ Bot A2019, log in to the Automation Anywhere support site to download and install the latest IQ Bot A2019 build.
A-People Downloads page (Login required)
- Update IQ Bot A2019: If you are using an earlier version of IQ Bot A2019, update to the latest available version.
[Update IQ Bot A2019 On-Premises to the latest version](#) on page 428
- Using IQ Bot
Cognitive automation in IQ Bot can learn and transform important, but less structured data to automate business processes quickly and efficiently.

Using IQ Bot features .

IQ Bot A2019 Community Edition

Receive your IQ Bot URL and login credentials.

- The URL points to your Automation Anywhere Enterprise instance.
- If you are an Automation Anywhere IQ Bot Community Edition user, the login credentials are those you set when you registered.
- Complete the steps in [Get started with Community Edition](#) on page 397.

The steps for IQ Bot Community Edition are the same as Automation Anywhere Enterprise registration.

- Begin using IQ Bot Community Edition by creating learning instances.

Watch the following video to understand how to create a learning instance in the IQ Bot A2019 Community Edition:

IQ Bot A2019 On-Premises



Important: The steps you perform to install IQ Bot A2019 On-Premises are the same as the installation steps for IQ Bot Version 6.5.2 and later.

1. Go to Automation Anywhere support site and download the IQ Bot A2019 On-Premises package:
A-People Downloads page (Login required)
2. Use the following installation instructions:
[Installing IQ Bot](#)

IQ Bot A2019 Cloud deployed

Follow these steps to deploy and register as a user:

1. Receive your Enterprise Control Room URL and login credentials
The URL points to your Automation Anywhere IQ Bot instance.
If you are your company's principal administrator and ordered Cloud deployed IQ Bot A2019, you receive an email from Automation Anywhere with your URL and credentials.
2. [Log in to Automation Anywhere Enterprise Control Room](#) on page 398
To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.
3. Create your users in the Enterprise Control Room.
You can create users for the following roles:
 - AAE_IQBotAdmin
 - AAE_IQBotServices
 - AAE_IQBotValidator

Use the assigned roles to connect to IQ Bot.

- Go to the Enterprise Control Room dashboard to access the IQ Bot URL link.

Connect to IQ Bot with the assigned user role, and begin creating learning instances.

Related concepts

[Get started with Enterprise A2019 Cloud](#) on page 279

Use these tasks to start creating and using bots with Automation Anywhere Enterprise A2019 Cloud.

[Migrate to IQ Bot A2019](#) on page 510

Migration is the process of upgrading from earlier versions of IQ Bot (11.x, 6.x, or 5.x) to the latest IQ Bot A2019 version. This includes replicating your existing database and repository, converting your bots to Enterprise A2019 format, and migrating all the learning instances.

IQ Bot system requirements

Review the operating system and database compatibility, database information, and the hardware and software requirements for IQ Bot A2019.



Legal disclaimer: The information provided in this workflow might vary depending on which offering is being used. Administrative instructions might not be applicable to IQ Bot A2019 Community Edition.

The following tables list the operating system and database compatibility with IQ Bot A2019 On-Premises:

Operating system	Supported platforms	Database type	Database version	Database edition
Microsoft Windows Server:	- Microsoft Azure Virtual Machines - Amazon Elastic Compute Cloud (Amazon EC2) - Google Cloud Platform - Amazon WorkSpaces	- Microsoft SQL Azure (RTM) - Amazon Relational Database Service (Amazon RDS) - Microsoft SQL Server	2019 2017 2016 2014 2012	- Express - Standard - Enterprise
2019 Data Center 2016 Data Center 2016 R2 Standard 2019 R2 Standard				

The following tables provide the required database information:

Microsoft SQL Server and Amazon RDS databases	
Required information	Description
Database (SQL Server) authentication	Provide credentials for a Microsoft SQL Server user who has permission to connect to the database.
Database name	IQ Bot
Database port	Default: 1433
Service credentials	Provides the user with the following permissions: - CONNECT SQL - CREATE ANY DATABASE - VIEW ANY DATABASE

Hardware requirements

IQ Bot	Recommendation
Application server optimum requirements	• 32 GB RAM • 8 Core Processor with support for AVX instructions set (this is a requirement starting from A2019.19) • 500 GB hard disk space • Ensure drive C has 100 GB plus free hard disk space
For all IQ Bot related database servers	• 16 GB RAM • 8 Core Processor  Note: If you are hosting IQ Bot databases along with other application databases, ensure the hardware resources are increased proportionately.

Software requirements

Software	Details
Database Management System	IQ Bot A2019 feature comparison matrix on page 234
Automation Anywhere Enterprise Control Room	IQ Bot A2019 version compatibility on page 238
Web browsers	Google Chrome 80 (or later)  Important: When using Internet Explorer11, you might have to Display intranet sites in Compatible View in the Compatibility View Settings window.

Software	Details
Dependencies	Automation Anywhere Enterprise requires the following software, which is automatically installed during the installation: • Microsoft .NET Framework v4.7.2 The system prompts for a restart to complete the update. • Erlang v23.0.4 • RabbitMQ v3.8.8 • NodeJS v10.22.1 • Microsoft SQL Server 2012 Native Client-QFE • Python 3.8.5 (32 bit)  Note: In a cluster environment, all dependencies will be installed on each machine where IQ Bot is installed.



Important: Automation Anywhere does not support stretch clusters.

- Ensure that all the HA cluster nodes are configured in the same location. Do not configure the nodes in a single HA cluster that is located across various sites. Ensure that you configure one HA cluster at the primary site and the other HA cluster at the secondary site.
- The Enterprise Control Room and IQ Bot must be configured in the same data center to ensure communication between both the applications.

Updating IQ Bot A2019

Update IQ Bot A2019 On-Premises to the most recent version for all the latest features and enhancements.

Ensure you back up your existing IQ Bot learning instances. Depending on the IQ Bot A2019 version you are currently using, the following update options are available:

- Update from earlier IQ Bot A2019 builds (1089, 1598, and 2079) to the latest IQ Bot A2019 On-Prem version

The earlier versions of IQ Bot A2019 had five databases. A single unified database is available starting with IQ Bot A2019 On-Premises Build 2545. Use the migration script to migrate these five databases to a unified database.

[Run IQ Bot On-Premises database migration script](#) on page 427

- Update to the latest version of IQ Bot A2019 On-Prem.

Ensure you update your existing IQ Bot A2019 On-Premises to the latest version which provides the product improvements and bug fixes.

[Update IQ Bot A2019 On-Premises to the latest version](#) on page 428

Run IQ Bot On-Premises database migration script

IQ Bot On-Premises Builds 1089, 1598, and 2079 included five databases. Starting with IQ Bot On-Premises Build 2545, one unified database is supported. You have to run a migration script to migrate the databases of Builds 1089, 1598, 2079 to the latest build.

Before you run the migration script, you must be on the latest IQ Bot On-Premises build, and verify that the SQL command utility `SQLCMD.exe` is installed on your system.

Also, verify and ensure Microsoft ODBC Driver 17 for SQL Server is installed on the IQ Bot server. This can be obtained from: <https://www.microsoft.com/en-us/download/details.aspx?id=56567>

1. Uninstall the current build of IQ Bot On-Premises.
2. Install the latest IQ Bot On-Premises build.

During installation, a new IQ Bot database is created.



Note: Remember your database username and password in order to the update migration script value.

3. Navigate to your Binn folder.

This might be located in `C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\170\Tools\Binn`.

4. Verify that `SQLCMD.exe` is installed.

If `SQLCMD.exe` is not installed, follow these steps:

- a. Download and extract the `Data Migration.zip` from the [Installation Setup](#) folder onto the IQ Bot server.
- b. Navigate to `DataMigration > UTILITY-MsSqlCmdLnUtils`.
- c. Run `MsSqlCmdLnUtils.msi` to install `SQLCMD.exe`.

After `SQLCMD.exe` is installed, run the migration script.

1. Access the `AA.IQBot_Database_Migration.bat` file within the `DataMigration` folder.
2. Edit the `AA.IQBot_Database_Migration.bat` file.
3. Update the values as follows:
 - a) Set the `SQLCMD` value to the path of your Binn.

```
SQLCMD="C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\170\Tools
\Binn\SQLCMD.exe"
```

- b) Set `LOGIN` value to your database username.

```
LOGIN="database username"
```



Note: The `bulkadmin`, `dbcreator`, and `public` roles are required to run the migration script.

- c) Set the `PASSWORD` value to your database password.

```
PASSWORD="database password"
```

- d) Set the `SERVER` value to the path of your database server hostname.

```
SERVER="path of database server hostname"
```


4. Run the migration script `AA_IQBot_Database_Migration.bat` file with administrator privilege. After the migration is complete, an output is created. Verify `C:\Datamigrationlog.txt` for log history and errors.



Note: If an output is not displayed, contact support.

Update IQ Bot A2019 On-Premises to the latest version

If you are using any of the earlier versions of IQ Bot A2019 On-Premises, you can update to the latest version, which offers enhancements and bug fixes.

It is recommended that you review your existing IQ Bot A2019 On-Premises version and back up your database, output path, and installation configuration files.



Note: Uninstall the existing version of IQ Bot A2019 On-Premises from your device before updating to the latest version.

1. Go to Automation Anywhere support site to download the latest version of the IQ Bot A2019 setup file.
A-People Downloads page (Login required)
2. Click the link to the latest IQ Bot A2019 setup file.
3. Click **Installation Setup**.
4. Download the `Automation_Anywhere_IQ_Bot_A2019_Build_<build number>.exe` file and install it.

[Installing IQ Bot](#)

The latest version of IQ Bot A2019 On-Premises is installed on your device.

Get started with IQ Bot

IQ Bot is a web-based, cloud-native intelligent document processing solution that can read and process various complex documents and emails. IQ Bot combines RPA with multiple AI techniques to intelligently capture, classify, and extract semi-structured and unstructured data, allowing document-centric business processes to be automated end-to-end.

IQ Bot A2019 is a hybrid solution for On-Premises and Cloud deployments, and includes a Community Edition. This is an interim solution provided for IQ Bot Cloud enablement and integration with Enterprise A2019.

From the A2019.13 release, IQ Bot A2019 has feature parity with IQ Bot Version 11.3.4.2, and some features from Version 11.3.5.

[IQ Bot A2019 feature comparison matrix](#) on page 234

Set up learning instances in IQ Bot A2019

Automation Anywhere processes customer data and uses the created bots to extract and parse the data to a CSV output file. This section describes the end-to-end process of how a new IQ Bot learning instance is set up for the first time.

1. In the Learning Instance tab, create a new learning instance, upload sample documents to train, and select the OCR engine for document processing.

- [Creating a learning instance](#)
 - [Select an OCR engine](#)
2. Train the uploaded sample documents in the IQ Bot Designer.
[Start training in the IQ Bot Designer](#)
 3. During the training, you can add and use custom logic in the Designer to improve data extraction in production.
[Add custom logic in IQ Bot to improve extraction](#)
 4. After training is complete, the learning instance is ready for production. You can upload documents for processing.
 5. In Automation Anywhere Enterprise Control Room, upload documents for processing the images and extracting the required fields into a CSV file using the IQ Bot Upload document action on the Bot Runner workstation. The IQ Bot server analyzes the uploaded documents using an AI model.
[Upload document action](#) on page 679

Files are uploaded from the local folder on the workstation to the IQ Bot server through a secure HTTPS session. Uploaded production documents are deleted after successful processing.

These uploaded documents are stored in a database. The data is encrypted and cannot be accessed by anyone.

[IQ Bot database encryption](#)
 6. Download the extracted data (csv file) by using the Download all documents action on the Bot Runner workstation. Besides the successfully extracted CSV files, this action also downloads any unclassified, untrained, and invalid documents to the local directory.
[Download all documents action](#) on page 678
 7. Unclassified and invalid documents are moved to a separate folder for manual validation.
[IQ Bot Validator](#)

Migrate to Enterprise A2019

Migrate to the latest Enterprise A2019 version from Automation Anywhere Enterprise versions 11.x or 10.x.

Plan your migration

- Review the Automation Anywhere Enterprise 11.x and 10.x versions that are supported for migration to Enterprise A2019.

[Supported versions for migration](#) on page 432

- Use the Bot Scanner to analyze your bots and identify commands and variables used in the bots that are supported for migration in Enterprise A2019.

[Scan bots using Bot Scanner](#) on page 448

Choose your migration path

Choose your migration path based on the Automation Anywhere Enterprise version you are currently using and the Enterprise A2019 deployment model that meets your business requirements:

If you are on this version	Use this migration procedure
11.x	Migrate to Enterprise A2019 On-Premises
10.x	Migrate to Enterprise A2019 On-Premises

Related tasks

[Update to latest Enterprise A2019 version](#) on page 420

If you are already using Enterprise A2019 On-Premises, you can update to the latest version of Enterprise A2019.

Understanding Enterprise A2019 migration

The migration feature enables you to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 10.x or 11.x to Enterprise A2019. The migration capability is available in Enterprise A2019 from Build 2079 onwards for On-Premises deployment.

The tools provided for migration perform the following functions:

Bot Scanner

Previously called the pre-migration utility, the Bot Scanner scans your existing bots (TaskBots and MetaBots) and generates reports. These reports provide information about the commands and variables used in these bots and how many of these commands and variables are supported for migration in Enterprise A2019.

A new version of Bot Scanner is released along with each Enterprise A2019 release. You can use the latest version of the Bot Scanner to monitor which commands and variables are supported for

migration in Enterprise A2019 with each update. You can run the tool without installing Enterprise A2019.

The Bot Scanner is available from the A-People Downloads page (Login required). See [Scan bots using Bot Scanner](#) on page 448 for instructions on using the tool.



Important: You can help improve migration to Enterprise A2019 by sharing the reports generated by the Bot Scanner. These reports help our engineering team focus on supporting the components that are more frequently used by our customers. No personally identifiable information (PII) is included and you can review the reports before sharing. Contact your Customer Success Manager (CSM) or Partner Enablement Manager (PEM) for more details.

This video demonstrates how to use the Bot Scanner to analyze your bots (TaskBots and MetaBots) and determine whether or not you are ready for migration from Enterprise version 11.x or 10.x to Enterprise A2019.

Migration wizard

This tool is integrated in Enterprise A2019 Enterprise Control Room and guides you through the process after you have completed the prerequisites steps. The migration wizard enables you to migrate multiple bots (TaskBots and MetaBots) and their dependent bots. The migration wizard migrates a bot only if all of the components used in that bot are supported for migration in Enterprise A2019. If a bot uses other dependent files such as .txt, .doc, and .png, you have to add these files as dependencies manually after migrating the bots.

This video demonstrates how to migrate 11.x Enterprise bots (TaskBots and MetaBots) in .atmx and .mbot format to .bot format for Enterprise A2019.

<https://fast.wistia.net/embed/iframe/ze8oa2k42q>



Certified versions for migration: Review the Automation Anywhere Enterprise 11.x and 10.x versions that are supported for migration to Enterprise A2019, see [Supported versions for migration](#) on page 432.

Unsupported features for migration

The 11.x Bot Runner and Bot Creator devices are not included in the migration process, so are not migrated to A2019. You must install A2019 Bot agent on the relevant devices to replace the Bot Runners. Use the A2019 web-based Bot editor to replace the Bot Creators.

Related reference

[Bot Scanner overview](#) on page 447

The Bot Scanner enables you to analyze the bots (TaskBots and MetaBots) created in Enterprise Control Room 11.x and 10.x and generates reports.

[Operating system, environment, and platform supported for Enterprise Control Room](#) on page 295

Enterprise A2019 can be hosted on AWS, Microsoft Azure, Google Cloud Platform, IBM, and any public, private, or hybrid cloud service that meets the Enterprise Control Room and Bot agent hardware and software requirements.

Supported versions for migration

Review the Automation Anywhere Enterprise 10.x and 11.x versions that are certified and supported for migration to A2019 on Microsoft Windows Server.

11.x versions certified for migration

If you are on any of the following Automation Anywhere Enterprise 11.x versions, you can migrate to A2019 as listed in the following table.

11.x versions to Enterprise A2019 On-Premises	
11.3.5.1	
11.3.5	
11.3.4.3	
11.3.4.1	
11.3.4	
11.3.3.3	
11.3.3	
11.3.2.4	
11.3.2.2	
11.3.2.1	
11.3.2	
11.3.1.9	
11.3.1.7	
11.3.1.5	
11.3.1	
11.3	

11.x versions to Enterprise A2019 On-Premises	
11.2.1.4	
11.2.1.3	
11.2.1.2	
11.2.1.1	
11.2	

10.x versions certified for migration

If you are on any of the following Automation Anywhere Enterprise 10.x versions, you can migrate to A2019 as listed in the following table.

10.x versions to Enterprise A2019 On-Premises
10.7.5
10.5.113
10.5.112
10.5.17
10.5.16
10.5.15
10.5.11
10.5.9
10.5.5
10.5.0
10.3.11
10.3.9
10.3.5

Migrate from 11.x to Enterprise A2019 On-Premises

Perform the tasks in this workflow to migrate from Automation Anywhere Enterprise 11.x to Enterprise A2019 On-Premises, including migration of your bots to Enterprise A2019. Dashboards created in Bot Insight for 11.x analytics bots are also migrated.

If you are installing Enterprise A2019 on a machine on which 11.x was previously installed, we recommend you delete the data from the Elasticsearch data folder located at `C:\ProgramData\elasticsearch\data`.

If the location of the Elasticsearch data folder was changed, you can find the updated information in the `C:\Program Files\Automation Anywhere\Enterprise\elasticsearch\config\elasticsearch.yml` file.

1. Prepare for migration:

- Review the Automation Anywhere Enterprise 11.x versions that are supported for migration to Enterprise A2019 On-Premises.

[Supported versions for migration](#) on page 432

- Compare the Enterprise A2019 and the Automation Anywhere Enterprise 11.x features to understand feature equivalency in Enterprise A2019.

[Enterprise A2019 feature comparison matrix](#) on page 224

- Review information about packages mapping and variables mapping to understand how 11.x commands and variables differ from the equivalent Enterprise A2019 packages and variables.

[Package mapping for migration](#) on page 453 | [Variable mapping for migration](#) on page 482

- We recommend that you create a backup of the 11.x database and restore it in the same or different SQL instance to avoid failure of any automation task that is using the 11.x database.

Bot Insight migration: The Bot Insight data and dashboards are migrated as part of the overall migration process. For the migration, clone your Bot Insight database (which is different from your 11.x Enterprise Control Room database) and extract and export your dashboard metadata to Enterprise A2019 using the Bot Insight pre-migration utility.

[Export 11.x Bot Insight dashboards for migration](#) on page 436

- Copy and paste the 11.x Enterprise Control Room repository and update access URL and repository path.

[Copy and paste 11.x information to A2019](#) on page 435

2. Install Enterprise A2019 On-Premises:

- a) Ensure you meet the system requirements.

[Enterprise A2019 On-Premises prerequisites](#) on page 286

- b) Install Enterprise A2019 On-Premises Enterprise Control Room in custom mode to a staging environment.

[Installing Enterprise Control Room using Custom mode](#) on page 330



Important: During the installation, configure the Enterprise A2019 On-Premises Enterprise Control Room to use the restored 11.x database.

3. Complete the pre-migration tasks.

[Pre-migration tasks](#)

4. Migrate the 11.x bots to Enterprise A2019.

[Migrate Enterprise bots](#) on page 495

5. Optional: Migrate audit log data.

[Migrate 11.x audit logs](#) on page 437

6. Verify the migration is complete:

- [View migration reports](#) on page 507
- [Verify the bot migration](#) on page 506
- [Export to CSV](#) on page 508

To learn more, search for the Migrating from enterprise 11 to Enterprise A2019 On-Premises course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

Copy and paste 11.x information to A2019

The 11.x server repository files and the credential vault file are required in the Enterprise A2019 environment. The most efficient way to get this data is to copy it from the 11.x environment into A2019.

You must copy from 11.x data and paste it before you install Enterprise A2019. You must also run the queries to update the Enterprise Control Room access URL and repository path.

1. Copy and paste the 11.x repository data.

The location of the 11.x repository is available at Administration > Settings > General from the 11.x Enterprise Control Room.

Configuration settings

- The `CredentialVault.dat` file is contained in the 11.x repository, so you do not need to copy the file separately.
- Ensure that you copy the `My Tasks` and `My MetaBots` folder along with other files and folders in the 11.x repository.
- If your 11.x Enterprise Control Room has version control enabled, then the latest versions of each bot including the dependencies are copied and migrated from the 11.x repository to A2019. However, the version history of the bot and its dependencies are not copied and migrated.

a) Create a folder for Enterprise A2019 at any location on the device.

For example, `D:\New project\A2019`.

b) Create the following folder in the Enterprise A2019 folder you created recently:

`Default\0\Automation Anywhere\Bots`

If we consider the folders you have created in the previous step, the final folder structure must be `D:\New project\A2019\Default\0\Automation Anywhere\Bots`.

c) Copy and paste the 11.x data in folder structure you have created in the previous step.

11.x files and folders to be copied	11.x location	Enterprise A2019 location
<code>CredentialVault.dat</code> file	<code>AutomationAnywhere\Server Files</code> folder in the 11.x repository.	<code>AutomationAnywhere\Server Files</code> folder in the Enterprise A2019 repository.
<code>My Tasks</code> and <code>My MetaBots</code> folder	<code>\AutomationAnywhere\Server Files\Default\Automation Anywhere\</code> folder in the 11.x repository.	<code>\AutomationAnywhere\Server Files\Default\0\Automation Anywhere\Bots\</code> folder in the Enterprise A2019 repository.

2. Update the Enterprise Control Room access URL and repository path by running the following SQL commands:

a) To update the access URL: `update CONFIGURATION set value = '[A2019 Control Room URL]' where category = 'CR_setup_general' and config_key = 'AccessUrl'`

Example query: `update [AAE-Database].[dbo].[CONFIGURATION] set value = 'http://A2019-crurl.com' where config_key='AccessUrl'`



Note: Do not include a slash (/) at the end of the access URL that you provide in the above command.

- b) To update the repository path: update CONFIGURATION set value = A2019 Control Room dynamic path where category = 'CR_setup_general' and config_key = 'RepositoryPath'
The dynamic path in the query is the dynamic path where you have pasted the copied 11.x data in the above step.

Example query: update [AAE-Database].[dbo].[CONFIGURATION] set value = 'D:\A2019' where config_key='RepositoryPath'

The path mentioned in the query is same as the dynamic path where the 11.x data is copied in the example in the previous step.

After installing Enterprise A2019, perform these steps:

1. Log in to Enterprise A2019.
2. Navigate to Bots > My Tasks.
3. Verify that all the data you pasted is available in the relevant files and folders.

Export 11.x Bot Insight dashboards for migration

Use the Bot Insight pre-migration utility to export your 11.x Bot Insight dashboard metadata (widgets and layouts) and dashboard profile as a zip file. Run this utility in your 11.x device and paste the zip file in the Enterprise A2019 repository to migrate the Bot Insight dashboards.

- Back up the Bot Insight database after you have backed up the 11.x Enterprise Control Room database and restore it in the SQL Server instance.

Ensure that you use the same username and password of the Enterprise Control Room database used in Enterprise A2019 when you restore the Bot Insight database.

- Ensure that JRE is installed in the 11.x device.
1. Download the latest version of the Bot Insight pre-migration utility from the Automation Anywhere Support site.



Important: You must download the utility on the device on which the 11.x Enterprise Control Room is installed.

- a) Navigate to the Automation Anywhere Downloads page: A-People Downloads page (Login required).
 - b) Click the Automation Anywhere Enterprise A2019 link.
 - c) Download the `AAE_Export_BI_Dashboards_< version_number>` file, for example, `AAE_Export_BI_Dashboards_A2019.17.jar`.
2. Run the utility in the 11.x device.
 - a) Open the Windows command prompt.
 - b) Run the following command to export the Bot Insight dashboards to a zip file: `java -jar "<path_of_downloaded_utility_jar>/AAE_Export_BI_Dashboards_<version_number>.jar" -installationPath "<installation_path>/Enterprise" -outputDir "<path_to_save_zip_file>/dashboards"`

For example: `java -jar "Downloads/AAE_Export_BI_Dashboards_A2019.17.jar " -installationPath "C:/Program Files/Automation Anywhere/Enterprise" -outputDir "E:/AA/work/release/A2019/migration/dashboard"`

The utility generates the `dashboards.zip` file at the output directory you specified.



Note: You can also use double backslash (\\) to run the JAR file.

3. Create the `bot-insight` folder at the Enterprise A2019 installation location.
For example, `C:\Program Data\Automation Anywhere\Server Files\bot-insight`

In this path, `C:\Program Data\Automation Anywhere\Server Files` is a dynamic path, which can be any location based on your requirement. The folder structure following the dynamic path (`\bot-insight`) is a constant path that does not change.
4. Copy the `dashboards.zip` file available at the output location and paste in the `Server Files\bot-insight` folder.

After exporting dashboards in the Enterprise A2019 repository, do the following for migrating the Bot Insight dashboards.

1. Install Enterprise A2019 and log in to your Enterprise A2019 staging environment.
[Installing Enterprise Control Room On-Premises](#) on page 284
2. Migrate the bots along with the Bot Insight data and dashboards using the Enterprise A2019 Bot Migration Wizard.
[Migrate Enterprise bots](#) on page 495

Migrate 11.x audit logs

The audit log export utility enables you to export the audit log data from the 11.x Enterprise Control Room to a JSON file. You must paste the JSON file in the Enterprise A2019 repository and then migrate the audit log data.

Ensure you have the `AAE_Admin` role or the `Manage Migration` permission.

Based on the current version of your Enterprise Control Room, choose one of the following ways to export and migrate the audit log data:

- For Version 11.3 and later:
 - a) Download the latest version of the audit log export utility from the Automation Anywhere Support site.



Important: You must download the utility on the machine on which the Version 11.3 Enterprise Control Room is installed. If the Enterprise Control Room is installed in Cluster mode, you can download the utility on any of the node available in the cluster.

- a. Navigate to the Automation Anywhere Downloads page: A-People Downloads page (Login required).
 - b. Click the Automation Anywhere Enterprise A2019 link.
 - c. Click Installation Setup, and then click the `AAE_Export_Audit_Log_<version_number>` zip file, for example, `AAE_Export_Audit_Log_A2019.16.zip`.
- b) Extract the files from the zip file you have downloaded.
 - c) Open the Windows command prompt.

- d) Change the working directory to `AAE_Export_Audit_Log_<version_number>`, for example, `AAE_Export_Audit_Log_A2019.16`, and enter the following command: `.\bin java -jar AAE_Export_Audit_Log_<version_number>.jar export.path="OUTPUT LOCATION" es.url="ELASTIC SEARCH URL"`

Update the following values in the command:

- **ELASTIC SEARCH URL:** Replace the text with the Elasticsearch URL that contains the audit logs you want to migrate. For example, `http://example.com:47599`.

Information about the port used by Elasticsearch is available in the `elasticsearch.properties` file, which is located at `C:\Program Files\Automation Anywhere\Enterprise\config\`. The value available in the `elasticsearch.port` attribute indicates the port used for Elasticsearch.

- **OUTPUT LOCATION:** Replace the text with the location where you want to save the output.
 - Ensure that the folders mentioned in the location exist.
 - Ensure that you specify the location of the output folder in double quotation marks. For example, `java -jar AAE_Export_Audit_Log_A2019.16.jar export.path="C:\Migration\Audit Log"`

The utility generates the `es_export.json` file at the output location you specified. The generated JSON file contains a maximum of 10000 records. If there are more than 10000 records available in the audit data, the utility generates multiple JSON files at the same location and adds a suffix such as `es_export_1`.

- e) Create the `migration\es-data` folders in the Enterprise A2019 repository.
- f) Copy the JSON file available at the output location.
If the utility has generated multiple JSON files, you must copy all the files.
- g) Paste the JSON file in the `Server Files\migration\es-data` folder.
- h) Log in to your Enterprise A2019 staging environment.
- i) Go to Administration > Migration.
- j) Click Migrate Audit log from the Migrate bots menu on the top-right of the screen.
The system starts retrieving and migrating the audit log data from the `es_export.json` file and uploading it to Enterprise A2019 Elasticsearch. The entries are displayed in the Audit Log tab of Enterprise A2019.

After the Audit log migration is complete, navigate to Administration > Migration page to view the status of the audit log migration and other related information. You can also filter the audit log migration results based on the migration Type as the Audit log migration.

Click the View migration option for each audit migration instance to see additional information such as the audit log file path and the reasons why individual `es_export.json` files were skipped or were not successfully migrated when migrating the audit logs.

[View migration reports](#) on page 507

- For version 11.2 and earlier:
 - a) Log in to your Enterprise A2019 staging environment.
 - b) Go to Administration > Migration.
 - c) Click Migrate Audit data from the Migrate bots menu on the top-right of the screen.

The system starts retrieving and migrating the audit data from the database and uploading it to the Enterprise A2019 Elasticsearch. The entries are displayed in the Audit Log tab of Enterprise A2019.

Related tasks

[View migration reports](#) on page 507

Use the reports to analyze the status of individual bot migration, data migration, and audit log migration and identify the status and summary of the individual migration.

Migrate from 11.x to existing Enterprise A2019 On-Premises

If you have already installed Enterprise A2019 On-Premises and you are actively using it, you can now migrate your 11.x data to Enterprise A2019. To migrate 11.x data, you must manually create the required 11.x entities such as users, roles, and credentials in Enterprise A2019, and then import and migrate 11.x bots to Enterprise A2019.

- Enterprise A2019 must be installed with a fresh database.
- You must have a valid Enterprise A2019 license and it must have the same entitlements as or more entitlements than your 11.x license.



Important: If you have already installed Enterprise A2019, you cannot migrate all of the 11.x data using the standard migration path of upgrading the database to Enterprise A2019.

1. Create all the entities such as users, roles, and credentials except bots in Enterprise A2019 the same as how they are available in 11.x.
2. Export all 11.x bots and their dependencies that you want to migrate to Enterprise A2019 using Bot Lifecycle Management.
[Export bots](#)
3. Import all 11.x bots to Enterprise A2019 using Bot Lifecycle Management.
[Import bots](#) on page 1163
4. Migrate the 11.x bots to Enterprise A2019.
[Migrate Enterprise bots](#) on page 495
5. Verify that the migration is complete:
 - [View migration reports](#) on page 507
 - [Verify the bot migration](#) on page 506
6. Optional: Migrate audit log data.
[Migrate 11.x audit logs](#) on page 437

How WLM data is migrated

Automation Anywhere Enterprise 11.x workload management (WLM) data is automatically migrated to Enterprise A2019 when you install Enterprise A2019 and point the Enterprise Control Room to the restored 11.x database.

When you migrate WLM data to Enterprise A2019, all related WLM is moved to the Enterprise A2019 environment, including queues, device pools, owners, and consumers. Migrated device pools are empty because the migration process does not migrate devices. You must update the device pool with the relevant unattended Bot Runner devices.

Bots associated with a workload template are migrated to the same Enterprise A2019 template with all information intact.

The following work item variables are supported for migration:

- `$WorkItem$` – How this variable is migrated depends on the String, Number, and DateTime type associated with it.

[Variable mapping for migration](#) on page 482

- `$WorkItemResult$` – Bots using this variable must be associated with a workload template in 11.x if you want to use it after migration. If you migrate a bot that has the `$WorkItemResult$` variable in a command and the bot is not linked to a workload template, then the command shows an error when it is opened in the Bot editor in Enterprise A2019.

The following work item variable operations are not yet supported and bots using these variable operations cannot be migrated successfully:

- Reset `$WorkItem$`
- Reset `$WorkItemResult$`

Related concepts

[Understanding Enterprise A2019 migration](#) on page 430

The migration feature enables you to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 10.x or 11.x to Enterprise A2019. The migration capability is available in Enterprise A2019 from Build 2079 onwards for On-Premises deployment.

Related tasks

[Edit device pools](#) on page 1076

As an Enterprise Control Room user with device pool management privileges or as a device pool owner, you can edit device pool details to customize your automation requirements.

[Use Work Item variables](#) on page 877

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

Migrate from 11.x to Enterprise A2019 on Linux CentOS

Perform the tasks in this workflow to migrate from Automation Anywhere Enterprise 11.x to Enterprise A2019 On-Premises on Linux CentOS, including migrating your bots to Enterprise A2019. If the 11.x bot is enabled for analytics, the associated Bot Insight data and business analytics dashboard are also migrated.

1. Prepare for migration:

- Review the Automation Anywhere Enterprise 11.x versions that are supported for migration to Enterprise A2019 On-Premises.

[Supported versions for migration](#) on page 432

- Compare the Enterprise A2019 and the Automation Anywhere Enterprise 11.x features to understand feature equivalency in Enterprise A2019.

[Enterprise A2019 feature comparison matrix](#) on page 224

- Review information about packages mapping and variables mapping to understand how 11.x commands and variables differ from the equivalent Enterprise A2019 packages and variables.

[Package mapping for migration](#) on page 453 | [Variable mapping for migration](#) on page 482

- We recommend that you create a backup of the 11.x database and restore it in the same or different SQL instance to avoid failure of any automation task that is using the 11.x database.
- Copy and paste the 11.x Enterprise Control Room repository and update access URL and repository path.

[Copy and paste 11.x information to A2019](#) on page 435

2. Copy and paste the 11.x Enterprise Control Room repository:
 - a) Use the `sudo mkdir -p /opt/automationanywhere/enterprise/appdata/` command to create the required A2019 folders.
 - b) Use the `sudo chmod -R 775 /opt/automationanywhere` command to provide the required permissions for the folders.
 - c) Use the `sudo mv` command to copy the 11.x repository and paste it in the `automationanywhere/enterprise/appdata/` location.

3. Update the Enterprise Control Room access URL and repository path by running the following SQL commands:

- a) To update the access URL: update CONFIGURATION set value = '[A2019 Control Room URL]' where category = 'CR_setup_general' and config_key = 'AccessUrl'

Example query: `update [AAE-Database].[dbo].[CONFIGURATION] set value = 'http://A2019-crurl.com' where config_key='AccessUrl'`



Note: Do not include a slash (/) at the end of the access URL that you provide in the above command.

- b) To update the repository path: update CONFIGURATION set value = `/opt/automationanywhere/enterprise/appdata/Server Files` where config_key = 'RepositoryPath'

4. Install Enterprise A2019 On-Premises:

- a) Ensure you meet the system requirements.
[Enterprise A2019 On-Premises prerequisites](#) on page 286
 - b) Install Enterprise A2019 On-Premises Enterprise Control Room in custom mode to a staging environment.

[Installing Enterprise Control Room on Linux](#) on page 359



Important: During the installation, configure the Enterprise A2019 On-Premises Enterprise Control Room to use the restored 11.x database.

5. Complete the pre-migration tasks.

[Pre-migration tasks](#)

6. Migrate the 11.x bots to Enterprise A2019.

[Migrate Enterprise bots](#) on page 495

7. Optional: Migrate audit log data.

[Migrate 11.x audit logs](#) on page 437

8. Verify the migration is complete:

- [View migration reports](#) on page 507
- [Verify the bot migration](#) on page 506
- [Export to CSV](#) on page 508

Migrate from 10.x to Enterprise A2019 On-Premises

Perform the tasks in this workflow to migrate from Automation Anywhere Enterprise 10.x to Enterprise A2019 On-Premises, including migration of your bots to Enterprise A2019.

1. Prepare for migration:
 - Review the Automation Anywhere Enterprise 10.x versions that are supported for migration to Enterprise A2019 On-Premises.
[Supported versions for migration](#) on page 432
 - Compare the Enterprise A2019 and the Automation Anywhere Enterprise 10.x features to understand feature equivalency in A2019.
[Enterprise A2019 feature comparison matrix](#) on page 224
 - We recommend that you create a backup of the 10.x database and repository, and restore it in the same or different device to avoid failure of any automation task that is using the 10.x database.

2. Install Enterprise A2019 On-Premises:
 - a) Ensure you meet the system requirements.
[Enterprise A2019 On-Premises prerequisites](#) on page 286
 - b) Install Enterprise A2019 On-Premises Enterprise Control Room in custom mode to a staging environment.
[Installing Enterprise Control Room using Custom mode](#) on page 330



Important: You must install Enterprise A2019 with a new database.

3. Complete the pre-migration tasks.
[Pre-migration tasks](#)
4. Copy the 10.x data to Enterprise A2019.
[Copy 10.x data](#) on page 442
5. Migrate the 10.x bots to A2019.
[Migrate Enterprise bots](#) on page 495
6. Verify the migration is complete:
 - [View migration reports](#) on page 507
 - [Verify the bot migration](#) on page 506
 - [Export to CSV](#) on page 508

Copy 10.x data

You must copy the 10.x data to Enterprise A2019 before you convert the 10.x bots.

1. Log in to your A2019 staging environment.
2. Click Administration > Migration.
3. Click Copy 10.x data.
4. Provide the following information on the GENERAL page.

Option	Action
Name	Enter a migration name or use the default one. The default migration name shows the name of the user who is logged in, current date, and time stamp.
Description	Enter a description for the migration.

5. Click Next.

6. Provide the following information on the DATABASE page.

Option	Action
Use secure connection	Select this option to use a secure connection to connect with the database.
Server host name	Enter the host name of the database server that contains the 10.x data you want to migrate.
Server port	Enter the port you want to use to connect with the database server.
Use database credentials	Select this option to use database credentials for authentication when establishing a connection with the database server. If you have selected this option, provide the credentials you want to use to connect to the database server in the Username and Password fields.
Use Windows authentication	Select this option to use Windows authentication for establishing a connection with the database server.  Important: This option works only if you have configured a domain account during installation and which has read and write permissions for 10.x database.
Database name	Enter the database name that contains the 10.x data you want to migrate.
Connect	Click this option to establish a connection with the database.

7. Click Next.

8. Provide the following information on the REPOSITORY page.

Option	Action
Repository path	Enter the location of the restored 10.x data that is available on the device.
Master key	Enter the master key for 10.x.
Validate	Click this option to validate the connection before you copy the 10.x data.

9. Click Copy data.

[Migrate Enterprise bots](#) on page 495

After you have successfully copied the 10.x data to Enterprise A2019, convert the 10.x bots.

Related concepts

[How 10.x data is copied to Enterprise A2019](#) on page 444

10.x users, roles, licenses, credentials, bots, and schedules are copied to Enterprise A2019 as part of the copy data process.

Related tasks

[Enable schedules after migration](#) on page 504

When you copy 10.x data to Enterprise A2019, the 10.x schedules are migrated. Version 11.x schedules are migrated when you update the 11.x data to Enterprise A2019.

How 10.x data is copied to Enterprise A2019

10.x users, roles, licenses, credentials, bots, and schedules are copied to Enterprise A2019 as part of the copy data process.

The system copies 10.x data in the following order:

1. Roles
2. Users
3. Credentials
4. Bots
5. Schedules

If the copy process skips an item in the sequence for any reason, then all related items are also skipped and are not migrated. For example, if the Bot_Manager role is not migrated and the user Jane_Smith only belongs to that role, then that user account and any credentials, bots, or schedules associated with that role are also not migrated.

10.x items	How 10.x items are copied to Enterprise A2019
Users	When you copy 10.x users the first time, if the system encounters a user of the same name in Enterprise A2019, the migration process renames the 10.x username by adding a suffix such as _1, _2, and so on, and then copies the renamed user to Enterprise A2019. For example, a duplicate username Jane_Smith is renamed as Jane_Smith_1 in Enterprise A2019. Subsequent data copy operations will skip the previously migrated user data. For Active Directory users, the system does not migrate duplicate users. If a domain user with the same name already exists in Enterprise A2019, the migration process skips that user and its dependencies.

10.x items	How 10.x items are copied to Enterprise A2019
Roles	The first time you copy 10.x roles, the migration process handles duplicate system roles and custom roles differently. The migration process maps 10.x system roles to Enterprise A2019 system roles. For example, the 10.x Admin role and Basic role are mapped to the AAE_Admin role and AAE_Basic role, respectively. If a custom role of the same name exists in 10.x and Enterprise A2019, the migration process renames it by adding a suffix such as _1, _2, and so on, and then copies the renamed role to A2019. For example, a duplicate Sales_Operations role is renamed as Sales_Operations_1 in Enterprise A2019. Subsequent data copy operations will skip previously migrated roles.
Licenses	The migration process automatically migrates user allocated licenses, but they are not shown in the migration report. If the A2019 Enterprise Control Room has fewer Bot Creator or Bot Runner licenses than 10.x Enterprise Control Room and all Enterprise A2019 licenses have been consumed, then newly migrated users will not be allocated any licenses. The system migrates these users and the related data without allocating any new licenses.
Credentials	For system credentials associated with a migrated user, the system migrates only the Email Settings and Autologin Settings system credentials. For credentials created by the Enterprise Control Room administrator, the system creates the AAE_10x_Credentials locker in the Enterprise A2019 Credential Vault and adds the credentials from 10.x as standard credentials. The system assigns the user who migrates the 10.x data as the owner of the AAE_10x_Credentials locker and all custom roles as consumers of the locker. If a locker with the name AAE_10x_Credentials already exists in Enterprise A2019, the system adds the migrated credentials in that locker.  Note: • Migration of credentials with more than 50 attributes is not supported. • Users with only AAE_Basic role assigned to them in 10.x must be granted a custom role in Enterprise A2019 to be a consumer of the AAE_10x_Credential locker.

10.x items	How 10.x items are copied to Enterprise A2019
Bots	If a bot of the same name exists in 10.x and Enterprise A2019, the copy data process skips the bot migration and its associated schedule. Commands that use credential variables in 10.x bots use the AAE_10x_Credentials locker after migration. If your 10.x Enterprise Control Room is configured with SVN version control, then the copy data process also copies the latest version of each bot including the dependencies from the 10.x repository to the A2019 repository. Use the bot migration wizard to migrate the 10.x bots to A2019. However, the version history of the bot and its dependencies are not copied and migrated.  Note: Migration of the production version of 10.x bots is currently not supported. As a workaround, make or set the current production version of the bots as the latest version and then migrate the bots.
Schedules	If duplicate schedules exist in both environments, the duplicate schedule is migrated and results in two schedules of the same name in Enterprise A2019. Migration of schedules fails if the associated user does not exist in Enterprise A2019.

Related tasks

[Copy 10.x data](#) on page 442

You must copy the 10.x data to Enterprise A2019 before you convert the 10.x bots.

[Enable schedules after migration](#) on page 504

When you copy 10.x data to Enterprise A2019, the 10.x schedules are migrated. Version 11.x schedules are migrated when you update the 11.x data to Enterprise A2019.

Manually migrate to Enterprise A2019 pure cloud

If you want to migrate from 11.x or 10.x to Enterprise A2019 Cloud but you do not want to be a part of the CMEAP (Cloud Migration Early Adopter Program), you can perform a manual migration. You must manually create the users, roles, permissions, and other entities that are required by the migrated bots to run successfully.

Ensure you have procured a license for Enterprise A2019 Cloud.

1. Plan your migration:

Use the Bot Scanner to analyze your bots and identify commands and variables used in the bots that are supported for migration in Enterprise A2019.

[Scan bots using Bot Scanner](#) on page 448

2. Prepare for the migration:

- Compare the Enterprise A2019 and the Automation Anywhere Enterprise 11.x features to understand feature equivalency in A2019.

[Enterprise A2019 feature comparison matrix](#) on page 224

- Review information about packages mapping and variables mapping to understand how 11.x commands and variables differ from the equivalent A2019 packages and variables.

[Package mapping for migration](#) on page 453 | [Variable mapping for migration](#) on page 482

3. Manually create the following 11.x or 10.x entities in Enterprise A2019 Cloud:

- [Create a user](#) on page 1106
- [Create and assign roles](#) on page 1110
- [Credentials and lockers in the Credential Vault](#) on page 1099

4. Upload the bots:

Version	Steps
11.x	Import bots on page 1163
10.x	a. Upload bot and its dependencies on page 884 The bots are uploaded to the private workspace in Enterprise A2019. Ensure you have created the same folder structure in the public workspace as in 10.x Enterprise Control Room. You must upload all dependent bots and other files required by the uploaded bots to run successfully in Enterprise A2019. All uploaded bots, their dependent bots, and other required files must be stored in the same folder in the Enterprise A2019 as in 10.x. b. Check in the uploaded bots that are available in the private workspace. Check in a bot on page 857

5. Migrate the bots to Enterprise A2019.

[Migrate Enterprise bots](#) on page 495

6. Verify the migration is complete:

- [View migration reports](#) on page 507
- [Verify the bot migration](#) on page 506
- [Export to CSV](#) on page 508

Bot Scanner overview

The Bot Scanner enables you to analyze the bots (TaskBots and MetaBots) created in Enterprise Control Room 11.x and 10.x and generates reports.

The Bot Scanner enables you to identify if you are ready for migration from version 10.x or 11.x to A2019 or not. If not, the Bot Scanner identifies the reasons why the bots (TaskBots and MetaBots) cannot be migrated.

The Bot Scanner scans the bots (.atmx and .mbot files) at the location you specify and generates a summary report that provides the following information:

- The number of bots scanned
- The number of bots that can and cannot be migrated to A2019.
- The commands and variables that are used in the scanned bots and supported in A2019

- The commands that are migrated to A2019 with some modifications that need to be reviewed.

It generates the summary report in HTML format and a separate report for each bot in XML format.

The objective of the Bot Scanner is to get information about the Automation Anywhere components used by the customers and accordingly prioritize support for the same in migrating the customer to A2019.

System requirements

Hardware

Processor	2.66 GHz or higher (64-bit)
RAM	2 GB or higher
Disc space	200 MB

Software requirements

Operating systems: Windows 7 or later (32-bit and 64-bit)

Scan bots using Bot Scanner

The Bot Scanner enables you to analyze the bots (TaskBots and MetaBots) created in Enterprise Control Room 11.x and 10.x and generates reports.

1. Download the latest version of Bot Scanner from the Automation Anywhere Support site.
 - a) Navigate to the A-People Downloads page (Login required).
 - b) Click the Automation Anywhere Enterprise A2019 link.
 - c) Click the `AAE_Bot_Scanner` zip file, and then click Download on the toolbar.
2. Extract the files from the zip file you have downloaded and double-click `AAE_Bot_Scanner.exe`.



Note: Ensure that you save the `AAE_Bot_Scanner.exe` file in a location path that does not contain a double-byte character. Otherwise, the Bot Scanner encounters an error when it is run.

3. In the Automation Anywhere Bot Scanner dialog box, enter the location of the folder that contains the bots that you want to analyze in the Select repository path field.



Important: You must create a copy of the Enterprise Control Room repository and provide the location of the copied folder instead of the actual repository folder.

- a) Copy the Enterprise Control Room repository.
For example, if the current location of the repository is `C:\ProgramData\AutomationAnywhere\Server Files\Default\Automation Anywhere`, you must copy the `Automation Anywhere` folder.
 - b) Paste the copied repository at a temporary location. For example, `D:\My_Bots` folder.
You must provide this location (`D:\My_Bots`) in the Select repository path field in Step 3.
4. Enter the location where you want to save the generated report in the Select destination folder field.



Note: The Bot Scanner related files and folders in the destination folder are overwritten if you have specified the same location when you have used the Bot Scanner previously.

5. Enter a value in the Timeout field to specify the maximum time the Bot Scanner should take to analyze a bot.
If the scanning of a bot takes more than the value specified in the Timeout field, Bot Scanner stops scanning that bot and proceeds to scanning other bots in the repository.
6. Click Create report.
The Bot Scanner starts analyzing the bots available in the repository.
The Bot Scanner displays an error if it scans a bot that is created using an unsupported version of Enterprise client. You must upgrade the bot to a supported version of Enterprise client and scan the bot again.
7. Optional: You can click Stop scanning when the Bot Scanner is analyzing the bots to cancel the operation.
The summary report and individual reports are available for the bots that were analyzed before the operation was canceled.
8. Click Open report to open the summary report in the default browser after the Bot Scanner has completed analyzing all the bots available in the repository.

[Analyze reports](#) on page 449

Related reference

[Bot Scanner overview](#) on page 447

The Bot Scanner enables you to analyze the bots (TaskBots and MetaBots) created in Enterprise Control Room 11.x and 10.x and generates reports.

[Analyze reports](#) on page 449

You can analyze the report generated by the Bot Scanner to get information about the bots (TaskBots and MetaBots) that can be migrated.

Analyze reports

You can analyze the report generated by the Bot Scanner to get information about the bots (TaskBots and MetaBots) that can be migrated.

The Bot Scanner provides the following key information about the bots:

- Number of bots analyzed
- Number and percentage of bots you can and cannot migrate to Enterprise A2019
- Commands and variables that are used in the bots and the frequency of usage
- Reasons why bots cannot be currently migrated and frequency of such occurrences
- Actions required by the users post migration due to change in the behavior of the commands



Important: Automation Anywhere Enterprise A2019 is updated frequently in order to achieve 100% functional equivalency with Automation Anywhere Enterprise 10.x or 11.x. The percentage of bots, commands and variables that are supported for migration in Enterprise A2019 will increase until it reaches 100% over the next upcoming releases. That is, for every function you do in 10.x or 11.x, an equivalent capability is in Enterprise A2019.

Most of the 10.x or 11.x features are available as is; however, some features are implemented differently to support client-less (web) operations. For these features, you have to change the way bots are written.

The Bot Scanner is designed to scan bots (TaskBots and MetaBots) created using both 10.x and 11.x versions of Enterprise client. The total file count includes the number of files that were skipped and not scanned.

The reports are available at the output location you specified in the Select destination folder field in the Automation Anywhere Bot Scanner dialog box. The Bot Scanner generates a summary report and a separate report for each bot that it scanned. It creates a separate report for each logic available in a MetaBot.

A `raw-data` folder is created that contains the reports (in XML format) for each bot scanned. It helps our engineers to further analyze the migration process and take corrective actions, if required. No personally identifiable information (PII) is included in the summary report or the individual reports of the scanned bots.

If you choose to share the reports with us to help improve the product, compress the files in the `raw-data` folder and coordinate with your Customer Success Manager (CSM) or Partner Enablement Manager (PEM). No data is automatically shared with Automation Anywhere.

The system creates four folders within the `raw-data` folder that contain various reports:

- `Migratable_Bots`: Contains reports of the bots that can be migrated to Enterprise A2019.
- `Non_Migratable_Bots`: Contains reports of the bots that cannot be migrated to Enterprise A2019.
- `Failed_to_Analyze`: Contains reports of the bots that Bot Scanner failed to analyze.
- `MetaBots`: Contains reports of the MetaBots that can and cannot be migrated to Enterprise A2019 and the ones that the Bot Scanner failed to analyze.

Summary report for all bots

The summary report provides the following information:

- **Summary section**: Provides information about whether you can migrate to Enterprise A2019, the total number of bots scanned and the bots supported for migration to Enterprise A2019 (in percentage). The section also provides information about the commands that are used in the scanned bots and supported for migration in Enterprise A2019 (in percentage).

For example, consider the Bot Scanner has scanned 10 bots and the bots use 50 commands. Of the 50 commands, if Enterprise A2019 supports 45 commands, the commands available in Enterprise A2019 are 90%.

- Separate tabs are available for the following:
 - List of bots that can be migrated to Enterprise A2019 and its frequency as a child bot (number of times that bot is used as a child bot in other bots). Click the name of a bot to view its XML report.
 - List of bots that do not require any action and can be migrated to Enterprise A2019.
 - List of bots that do not require any review and can be migrated to Enterprise A2019.
 - List of bots that can be migrated to Enterprise A2019 and should be reviewed in case they have to be modified due to any change in the Enterprise A2019 product behavior compared to the 11.x or 10.x version. The following tabs are available:
 - **Bots**: Lists the bots that contain commands that require a review. You can also view information about the name of the bot, its location, and its frequency as a child bot.
 - **Messages**: Lists review messages about the change in behavior of a command. View information about the number of bots that contain the command for which the message is displayed and the number of times that command is used in these bots. You can click a message to view the bots that contain the command, location of the bot, and the line numbers where the command is used in each bot.

- List of bots that cannot be currently migrated to Enterprise A2019 and the number of times that bot is used as a child bot in other bots. Click the name of a bot to view the list of commands that are currently not supported in Enterprise A2019 and the line number where the command is located in the bot.

A parent bot is not migrated to Enterprise A2019 if any of the child bot cannot be migrated to Enterprise A2019. Similarly, a MetaBot is not migrated to Enterprise A2019 if any of the logic available in that MetaBot cannot be migrated to Enterprise A2019.

- List of commands that can be migrated to Enterprise A2019 and the number of times they are used in the bots.
- List of commands and system variables that cannot be migrated to Enterprise A2019.

The tab also provides the following details:

- The number of parent bots that contains the child bots which cannot be migrated because of the commands or variables used in the child bots that are not supported in Enterprise A2019.
- Total number of times these commands or variables are used in the scanned bots.
- The upcoming Enterprise A2019 release in which a particular command or variable will be available.

You can click the Download csv option available on each tab to download the details into a CSV file.



Note: For commands and variables that are currently not supported, support will be added in upcoming releases.

The report is valid until the next version of Bot Scanner is available. When the next version of Bot Scanner is available, a report expiry message is displayed. You must download the latest version of Bot Scanner and scan the bots again.

Report for an individual bot

The report for each bot provides information about its dependencies, variables, and commands used.

The individual bot report looks similar to the following code:

```
<analysis version="1.3.0">
  <stat>
    <dependencies ucount="0" count="0"/>
    <errors ucount="6" count="12">
      <error count="1">System variable $AAApplicationPath
$</error>
      <error count="1">Command [If FolderNotExist]
is not supported</error>
      <error count="3">System variable $CurrentDirectory
$</error>
      <error count="3">System variable $Extension$</error>
    </errors>
  </stat>
  <commands>
    <command target-action="assign" name="VariableOperation"
line="1"
      grp="VariableOperation" api="VarOpe">
      <msg type="error" review="true"
category="variable">System
        variable $AAApplicationPath$</msg>
      <msg type="info" review="false"
category="default">Command
```



```

parameter [Option] of type [String] is not
required.</msg>
</command>
<command target-action="createFolder"
name="createFolder" line="3"
grp="FilesFolders" api="CreateFolder"/>
<command target-action="copyFiles" name="CopyFiles"
line="5"
grp="FilesFolders" api="CreateFolder"/>
<command target-action="connect" name="Connect"
line="3"
grp="Database" api="Connect"/>
<command target-action="OpenCSVTXT" name="ReadFrom"
line="9"
grp="CsvText" api="Csv"
<msg tpye="info" review="false"
category="command">Line
in 11.x client, there is no separate option given
for CSV
and TEXT in Enterprise A2019</msg>
<msg type="error" review="true"
category="variable">System
variable $CurrentDirectory$</msg>
<msg type="error" review="true"
category="variable">System
variable $Extension$</msg>
<msg type="error" review="true"
category="variable">System
variable $FileName$</msg>
</command>
</commands>
<variables>
<variable name="$CSV-TXT-Default-DATA$"
type="TABLE" value-type=""/>
</variables>
</analysis>

```

The following table describes the various attributes available in the XML report shown in the previous image:

Node	Attribute	Description
Stat	--	Provides information about the number of dependencies, error, and warnings.
--	dependencies	Specifies the number of dependencies for the bot. The ucount indicates the number of unique dependencies and the count indicates the total number of dependencies.
--	error	Specifies the number of errors for the bot. The ucount indicates the number of unique errors and the count indicates the total number of errors.
Command	--	Provides information about the various commands and actions used in the bot.
--	command target-action	Specifies the action being performed for the command.
--	name	Specifies the name of the command.

Node	Attribute	Description
--	line	Specifies the line number where the command is available in the bot.
--	grp	Specifies the command group the command belongs to.
--	api	Specifies the name of the API the command uses.
--	msg type	Provides information about the message type. The <code>error</code> type indicates that the command cannot be migrated to Enterprise A2019, and an <code>info</code> type indicates that the command can be migrated but some of its attributes will be changed during migration.
--	review	Provides information about whether the command has to be reviewed. This attribute is always true for <code>error</code> type messages, which indicates that migration of that command to Enterprise A2019 is not yet supported. For <code>info</code> type messages, if the attribute is true, you must review the value in the <code>category</code> attribute. You can decide whether you want to take any action on the migrated bot based on the value available in the <code>category</code> attribute.
--	category	Provides information about the command or variable for which the message is displayed.
Variables		Provides information about the system variables used by the bot.
--	variable name	Specifies the name of the variable.
--	type	Specifies the type of variable.
--	value type	Specifies the type of value provided for that variable.

Package mapping for migration

This page contains information about 10.x and 11.x commands and how they map to respective Enterprise A2019 actions or packages. In some cases, a 10.x or 11.x command migrates to more than one A2019 action. This is to ensure that the behavior of the migrated bot is unchanged.

A2019 has a new package called Legacy automation. This package provides the additional support needed during migration. The Legacy automation package is for use during migration only; we do not recommend using this package for new bot development. [Legacy Automation package](#) on page 681

You can migrate bots when the user doing the migration is using an authenticated proxy server.

The following are some key behavior differences:

- In A2019, the single dollar sign (\$) is reserved for Automation Anywhere Enterprise use, so all user entries of a single dollar sign are automatically replaced with two dollar signs (\$\$). For example, if you have a text field, "Pay \$5.00", we convert that field to read "Pay \$\$5.00" in A2019 for it to display properly to users.
- For MetaBots, the migration process migrates the DLLs and logic to equivalent bots. The Run Logic command is converted to the Run action of the Task Bot package.

The DLLs in the MetaBots use the Execute command to run a function from that DLL. After migration to A2019, each Execute command is converted to Open, Run function, and Close actions of the DLL package. Information about which function to run from the DLL, which parameters to use, and other details in the Execute command is migrated to the Run action. MetaBots with DLLs that use credential variables of string, character, and Byte data type can be migrated to Enterprise A2019.

Earlier to A2019.17, the dictionary variable was used to provide input parameters in a migrated bots which used to add additional steps in the bot. From A2019.17 onward, the Entrylist variable is used to provide input parameters in a migrated bot. This reduces the number of steps added to the migrated bot.

[How MetaBots are migrated](#) on page 498

- For 10.x/11.x command using a windows title field configured with a user defined variable, the migration process migrates the bot by adding the Set Title action just above the respective command. A2019 does not allow user variables in the Windows Title field. Use the Set Title action to achieve the same behavior.
- In 11.x, when a bot contains more than one command with the resize window option selected, the window is resized to the dimensions specified by the first command. In A2019, the window is resized each time the bot encounters an action with the resize window option selected. This ensures that at runtime the window dimensions of each action match the dimensions at which that action was configured, which enhances the bot's ability to find the object.
- 10.x/11.x provides various pre-sets as part of the windows title selection and they are migrated to respective pre-sets in A2019.

10.x/11.x Options	A2019 Options
Current Active Window	Current Active Window
Desktop	- For the Insert mouse click command, use the Screen for window title option. - For the Insert keystroke command, use the Current Active Window option. - For Screen > Capture area, use the Screen for window title option. - For the Capture Desktop command of the Screen Capture command, use the Capture area action of the Screen package with the Screen option selected from the list available in the Application tab.
Wallpaper	Desktop
Taskbar	Taskbar

- In 10.x/11.x, loop indexing of table starts with 1 and increments by 1. A2019 starts indexing with 0 and increments by 1.
- For each variable passed as input in 11.x or 10.x bot, a line is added in the migrated bot in Enterprise A2019. For example, if you are passing 100 variable as input in 11.x bot, after migration that bot has 100 new lines.
- 11.x or 10.x allows you to specify a session name to open a file or establish a connection and use a variable in a loop command to use the same session. After migrating these bots to Enterprise A2019, you must update the bot to use either a session name or variable to open a file and in a loop command.
- 10.x/11.x actions that store the return values to the \$Clipboard\$ system variable are not supported in A2019. When you migrate bots with this functionality, the migration process assigns the values to a temporary variable and then assigns the value to the A2019 \$System:Clipboard\$ system variable by adding the Copy To action to the Clipboard package.
- The migration process migrates IF and Loop commands that contain multiple conditions of a variable.
- In 10.x/11.x, some String operation commands use Tab, Enter, and Separator special characters. In A2019, these characters are system variables in the String package.

10.x/11.x	A2019
[Tab]	\$String:Tab\$
[Enter]	\$String:Enter\$
[Separator]	\$String:Separator\$

See [String package](#) on page 794.

- In 11.x/10.x, bots can use a variable to specify the child bot you want to run. In A2019, the task path is updated to the Bots folder. The following table provides a few examples:

11.x/10.x	A2019
D:\My Documents \AAE_V11\Automation Anywhere Files\Automation Anywhere\My Tasks\Migration\bot_name\$	Bots\My Tasks\Migration\bot_name \$
\$AAApplicationpath\$\Automation Anywhere\My Tasks\Migration\ bot_name\$	Bots\My Tasks\Migration\bot_name \$
D:\\$UserName\$\My Documents \AAE_V11\Automation Anywhere Files\Automation Anywhere\My Tasks\Migration\bot_name\$	Bots\My Tasks\Migration\bot_name \$
D:\My Documents \AAE_V11\Automation Anywhere Files\Automation Anywhere\ bot_path\$\bot_name\$	Bots\My Tasks\bot_path\$\ bot_name\$

- Some commands return values to variables for further processing. In 10.x/11.x, users can store these values in different types of variables, where as in A2019, these values are stored in a specific type of variable only.

For example, if a command returns a value to an array for a specific cell, then in A2019, we store the value in a temporary string variable. Then in the next action, we store this temporary value to an actual array variable to ensure that the bot execution logic stays intact.

- Disabled commands are migrated as follows based on the different coding patterns:
 - An individually disabled command (with or without any validation error) is migrated as a disabled action. All actions are disabled if one disabled command is migrated to multiple actions in A2019.
 - Disabled Error Handling command is migrated to disabled try and catch block including all other actions depending on its configuration.
 - Disable Loop command is migrated to a disabled Loop action in A2019.
 - Disabled If command is migrated as a comment if the command has a complex structure because of Else/If and Else commands. We migrate them as a comment to make sure the migrated bot returns the same result as 10.x/11.x bots.

The following table lists the packages available for migration and how they map to A2019. N/A means there are no changes. A2019.

Package	How it is migrated to A2019	What you need to do
Active Directory	Respective Active Directory commands are migrated to the Connect and Disconnect actions. Each command is migrated as follows: • Modify group command with the Rename group option is migrated to the Rename group action. • Modify group command with the Delete group option is migrated to the Delete group action. • Modify group command with the Add users to group option is migrated to the Add users to group action. • Modify group command with the Remove users from group option is migrated to the Remove users from group action. • Modify group command with the Set property option is migrated to the Set group property action. • Modify group command with the Disable user account option is migrated to the Disable user account action. • Modify group command with the Update user details option is migrated to the Update user details action. • Modify user command with the Rename user option is migrated to the Rename user action. • Modify user command with the Delete user option is migrated to the Delete user action. • Modify user command with the Enable user account option is migrated to the Enable user account action. • Create object command with the Computer object option is migrated to the Create computer action. • Create object command with the Organizational unit object option is migrated to the Create organizational unit action. • Search command with the Run Query option is migrated to the Run query action. • Search command with the Get all users of a Group is migrated as Get all users of a group. • Get property command with the User option is migrated to the Get user property action. • Get property command with the Group option is migrated to the Get group property action. • Get property command with the Computer option is migrated to the Get computer property action. • Get property command with the Organizational unit option is migrated to the Get organizational unit property action. • The options in the Modify Object command with Computer object type are migrated as follows: • Rename Object option is migrated to the Rename computer action • Delete Object option is migrated to the Delete computer action • Move Object is migrated to the Move computer action • Set Property is migrated to the Set computer property action • The options in the Modify Object command with Organizational unit object type are migrated as follows: • Rename Object option is migrated to the Rename organizational unit action • Delete Object option is migrated to the Delete organizational unit action • Move Object is migrated to the Move organizational unit action • Set Property is migrated to the Set organizational unit property action	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
App Integration	App Integration in A2019 does not have actions for each technology, unlike in 10.x/11.x. In A2019, all actions are divided into individual actions. Capture text from All 10.x/11.x App Integration commands that capture text from a window is migrated to the App Integration > Capture text from window action in A2019. Capture area The 10.x/11.x Capture area command behaves inconsistently, sometime returning the output result of an entire window instead of the selected area and sometime returning no text. In A2019, this action consistently returns the selected area text. Capture scrollable text All the 10.x/11.x App Integration commands that capture text from an application window with a vertical scroll bar is migrated to the App integration > Capture scrollable text action in A2019. The captured images are also migrated. App Integration package on page 533	N/A – the migration process maps the fields automatically.
Clipboard	All commands of Clipboard are migrated to equivalent actions of the A2019 Clipboard package. There is no change in behavior or command name. See Clipboard package on page 546.	N/A – the migration process maps the fields automatically.
Comment	Comment is migrated to A2019 Comment action.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do						
Database	10.x/11.x uses ODBC drivers and A2019 uses JDBC drivers. The SQL Query action is called Read from in A2019. The following table shows the commands that currently can be migrated. <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Connect</td><td>Migrates to the Connect command. If you encounter an unsupported connection string in A2019, the reasons might vary based on your environment. More details are available as part of the migration process. Contact Technical Support if you need assistance resolving the issue.</td></tr><tr><td>Run Stored Procedure</td><td>The parameter name and output parameter are mandatory fields in A2019.</td></tr></table> See Database package on page 557.	10.x/11.x	A2019	Connect	Migrates to the Connect command. If you encounter an unsupported connection string in A2019, the reasons might vary based on your environment. More details are available as part of the migration process. Contact Technical Support if you need assistance resolving the issue.	Run Stored Procedure	The parameter name and output parameter are mandatory fields in A2019.	Run stored procedure After you migrate the bot, you must provide the parameter name and output parameter type. N/A – the migration process maps the fields automatically.
10.x/11.x	A2019							
Connect	Migrates to the Connect command. If you encounter an unsupported connection string in A2019, the reasons might vary based on your environment. More details are available as part of the migration process. Contact Technical Support if you need assistance resolving the issue.							
Run Stored Procedure	The parameter name and output parameter are mandatory fields in A2019.							
Delay	Delay command is migrated to the Delay action in A2019. "Delay in Milliseconds" and "Delay in Seconds" options (11.x) have changed to radio options within the Time unit area (A2019). See Delay package on page 575.	N/A – the migration process maps the fields automatically.						
Email	There is no concept of session for Email commands in 10.x/11.x. However, A2019 has Connect and Disconnect actions to make sure email session are started and closed. Hence during migration, the system places the Connect action before the respective email action and the Disconnect action after the respective email action. The Save attachment option of the Get All Messages command is now a dedicated action called Save attachment in the Email package in A2019. For bots created to automate email-related tasks on the Exchange Web Services (EWS) server, the Get All Message command is migrated to the Loop action with the iteration set to For all each mail in mailbox. Similarly, the Delete and Delete all commands are migrated to Delete and Delete all actions. See Email package on page 584.	N/A – the migration process maps the fields automatically.						

Package	How it is migrated to A2019	What you need to do								
Error Handling	Disabled Error Handling commands are not migrated to A2019. Begin Error Handling and End Error Handling is migrated to the Try/Catch block of the Error handler package in A2019. Many options available in Begin Error Handling are migrate to respective A2019 actions. Refer the below table for details: <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Continue</td><td>By default, execution continues after executing the Catch block in A2019.</td></tr><tr><td>Stop</td><td>Stop action of the Task package is added in the Catch block.</td></tr><tr><td>Take Snapshot</td><td> When the Take Snapshot option is selected and the location is provided in the File Path field of the 11.x bot, the migrated bot contains: • The Capture desktop action of the Screen package to capture the error screen. • The Log to file action of the Log To File package to capture the error message in a text file. • The To string action of the Datetime package to convert the datetime value to string that will be stored in the text file along with the error message. The above actions are added in the Catch block of the migrated bot and the captured image and the error message are stored at the location provided in the File Path field of the 11.x bot. When the Take Snapshot, Send Email, and Attach Sanpshot options are selected and the location is not provided in the File Path field in the 11.x bot, the migrated bot contains the following: • The Create action of the Folder package to create </td></tr></table>	10.x/11.x	A2019	Continue	By default, execution continues after executing the Catch block in A2019.	Stop	Stop action of the Task package is added in the Catch block.	Take Snapshot	When the Take Snapshot option is selected and the location is provided in the File Path field of the 11.x bot, the migrated bot contains: • The Capture desktop action of the Screen package to capture the error screen. • The Log to file action of the Log To File package to capture the error message in a text file. • The To string action of the Datetime package to convert the datetime value to string that will be stored in the text file along with the error message. The above actions are added in the Catch block of the migrated bot and the captured image and the error message are stored at the location provided in the File Path field of the 11.x bot. When the Take Snapshot, Send Email, and Attach Sanpshot options are selected and the location is not provided in the File Path field in the 11.x bot, the migrated bot contains the following: • The Create action of the Folder package to create	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019									
Continue	By default, execution continues after executing the Catch block in A2019.									
Stop	Stop action of the Task package is added in the Catch block.									
Take Snapshot	When the Take Snapshot option is selected and the location is provided in the File Path field of the 11.x bot, the migrated bot contains: • The Capture desktop action of the Screen package to capture the error screen. • The Log to file action of the Log To File package to capture the error message in a text file. • The To string action of the Datetime package to convert the datetime value to string that will be stored in the text file along with the error message. The above actions are added in the Catch block of the migrated bot and the captured image and the error message are stored at the location provided in the File Path field of the 11.x bot. When the Take Snapshot, Send Email, and Attach Sanpshot options are selected and the location is not provided in the File Path field in the 11.x bot, the migrated bot contains the following: • The Create action of the Folder package to create									

Package	How it is migrated to A2019	What you need to do														
Excel	The 10.x/11.x Excel commands are migrated to respective A2019 actions of the Excel Advanced package. In 11.x, a bot can open a Microsoft Excel spreadsheet even when a file extension is not provided. In A2019, the migrated bots uses the Open action in the Excel advanced package to open a Microsoft Excel spreadsheet when a file extension is not provided. In 10.x/11.x, data returned by Get Multiple Cells and Get All Cells commands are returned to the Loop > Each Row in an Excel Dataset command. In A2019, the functionalities of Get Multiple Cell and Get All Cells are available in Loop > Each Row in an Excel Dataset action, so values from these commands are migrated to the loop instead of actual actions. The following table shows action name changes: <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Save Spreadsheet</td><td>Save workbook</td></tr><tr><td>Open Spreadsheet</td><td>Open</td></tr><tr><td>Close Spreadsheet</td><td>Close</td></tr><tr><td>Get Cells</td><td>Divided into Get single cell and Get multiple cells actions</td></tr><tr><td>Activate Sheet</td><td>Switch to sheet</td></tr><tr><td>Find/Replace</td><td>Divided into Find and Replace actions</td></tr></table> See Excel advanced package on page 605. In 11.x or 10.x and in Enterprise A2019, a session (used to open a Microsoft Excel spreadsheet) can be shared between the parent bot and a child bot. In Enterprise A2019, you can close a shared session from the child bot.	10.x/11.x	A2019	Save Spreadsheet	Save workbook	Open Spreadsheet	Open	Close Spreadsheet	Close	Get Cells	Divided into Get single cell and Get multiple cells actions	Activate Sheet	Switch to sheet	Find/Replace	Divided into Find and Replace actions	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019															
Save Spreadsheet	Save workbook															
Open Spreadsheet	Open															
Close Spreadsheet	Close															
Get Cells	Divided into Get single cell and Get multiple cells actions															
Activate Sheet	Switch to sheet															
Find/Replace	Divided into Find and Replace actions															

Package	How it is migrated to A2019	What you need to do																		
File/Folder	All commands of File/Folder have been split into File and Folder packages.	N/A – the migration process maps the fields automatically.																		
	The following File related actions have changed in A2019:																			
	<table><tr><th>11.x</th><th>A2019</th></tr><tr><td>Copy Files</td><td>Copy action of the File package</td></tr><tr><td>Create Files</td><td>Create action of the File package</td></tr><tr><td>Delete Files</td><td>Delete action of the File package</td></tr><tr><td>Open Files</td><td>Open action of the File package</td></tr><tr><td>Print Files</td><td>Print action of the File package</td></tr><tr><td>Rename Files</td><td>Rename action of the File package</td></tr><tr><td>Unzip Files</td><td>Unzip action of the Folder package</td></tr><tr><td>Zip Files</td><td>Zip action of the Folder package</td></tr></table>		11.x	A2019	Copy Files	Copy action of the File package	Create Files	Create action of the File package	Delete Files	Delete action of the File package	Open Files	Open action of the File package	Print Files	Print action of the File package	Rename Files	Rename action of the File package	Unzip Files	Unzip action of the Folder package	Zip Files	Zip action of the Folder package
	11.x		A2019																	
	Copy Files		Copy action of the File package																	
	Create Files		Create action of the File package																	
	Delete Files		Delete action of the File package																	
	Open Files		Open action of the File package																	
	Print Files		Print action of the File package																	
	Rename Files		Rename action of the File package																	
	Unzip Files		Unzip action of the Folder package																	
	Zip Files		Zip action of the Folder package																	
	The following Folder related actions have changed in A2019:																			
	<table><tr><th>11.x</th><th>A2019</th></tr><tr><td>Copy Folder</td><td>Copy action of the Folder package</td></tr><tr><td>Create Folder</td><td>Create action of the Folder package</td></tr><tr><td>Delete Folder</td><td>Delete action of the Folder package</td></tr><tr><td>Open Folder</td><td>Open action of the Folder package</td></tr><tr><td>Rename Folder</td><td>Rename action of the Folder package</td></tr></table>		11.x	A2019	Copy Folder	Copy action of the Folder package	Create Folder	Create action of the Folder package	Delete Folder	Delete action of the Folder package	Open Folder	Open action of the Folder package	Rename Folder	Rename action of the Folder package						
	11.x		A2019																	
	Copy Folder		Copy action of the Folder package																	
	Create Folder		Create action of the Folder package																	
Delete Folder	Delete action of the Folder package																			
Open Folder	Open action of the Folder package																			
Rename Folder	Rename action of the Folder package																			
See File package on page 627) and Folder and Folder package on page 633.																				
11.x bots can use regular expressions in the Copy Files, Delete Files, Print Multiple Files, Rename Files, and Zip Files commands to search for files on which you want to perform an operation. The equivalent actions in Enterprise A2019 too can use regular expressions to search for files on which you want to perform an operation.																				

Package	How it is migrated to A2019	What you need to do
FTP/SFTP	All commands of FTP/SFTP are migrated to equivalent A2019 actions of the FTP/SFTP package. There is no change in behavior or command name. Get files and Get folder actions return runtime errors if they have additional criteria based on dates, which are provided as variables that have values in a format other than MM/DD/YYYY. You must fix such instances after bot migration. During the migration process, these two actions also add extra error handlers in the migrated bots when filtering is done on datetime.	N/A – the migration process maps the fields automatically.
If/Else > Variable	Variables containing string condition We migrate IF with the following operators as a String condition in A2019: • = • < > • Include • Does not Include For the Random variable of the String sub-type, A2019 adds the Generate random string action of the String package to generate a random string above the If condition and assigns the value to the respective migrated variable. Variable containing number condition We migrate IF with the following operators as a Number condition in A2019: • >= • <= • > • < For the Random variable of the Number sub-type, A2019 adds the Assign a random number action of the Number package to generate a random string above the If condition and assigns the value to the respective migrated variable. Value type variable containing date The system tries to evaluate if a condition on a variable has a date value. If found, it migrates IF with the Datetime condition in A2019. Otherwise, the system migrates it as a string or number condition based on the operator used. In those cases, you must change it to a date condition after the bot migration if a date operation is involved. Additionally, you might also need to change the date format to one that is compatible with your data. The default format used to convert a date to string is MM/dd/yyyy HH:mm:ss. See If package on page 656.	If a condition involves date, under certain situation, you must change the migrated information to a date condition after the bot migration.

Package	How it is migrated to A2019		What you need to do
If/Else (Other conditions)	The table below shows how various conditions are migrated to the respective A2019 conditions.		N/A – the migration process maps the fields automatically.
	10.x/11.x	A2019	
	Task Successful or Task Unsuccessful	Migrated to the equivalent If condition of Task Bot package.	
	Script Successful or Script Unsuccessful	Script successful/ unsuccessful is migrated to respective If > Script Successful and If > Script Unsuccessful actions of the Legacy automation package.	
	Object Properties	Migrated to the If > Condition > Window Exists and Object conditions of the Recorder package.	
	Application Running or Application Not Running	Migrated to the equivalent If condition of the Application package.	
	File Exists, File Does Not Exist, File Date, File Size	Migrated to the equivalent If condition of the File package.	
	Folder Exists or Folder Does Not Exist	Migrated to the equivalent If condition of the Folder package.	
	Ping Successful Or Ping Unsuccessful	Migrated to the equivalent If condition of the Ping package.	
	Web Control Exists or Web Control Does Not Exist	Migrated to the equivalent If condition of the Legacy Automation package.	
	Window Exists/Window Does Not Exist	The following commands configured with the "Show child and hidden windows" option selected are migrated to the A2019 Legacy Automation package: • If > Condition > Window Exists • If > Condition > Window Does Not Exist	
	Logic Successful/Logic Unsuccessful	The Ifcommand is migrated to If > Task Successful and If > Task Unsuccessful respectively. The Elself command is migrated to Else If >	

Package	How it is migrated to A2019	What you need to do
Image Recognition	The Image Recognition command is split into Find file image inside window image and Find window image inside another window image actions in A2019. In A2019, Advance is the default comparison mode and actions with the Gray-Scale, Normal, or Monochrome option selected are migrated as Advance. The migration process maps the information automatically and does not impact related bots. Migration of bots with the Image Recognition command might fail if the command is using any file type other than: • .jpg • .jpeg • .jpe • .jfif • .bmp • .gif See Image Recognition package on page 660.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do																												
Insert Keystrokes	This command is called Simulate Keystrokes in A2019. The following keystroke conventions have changed:	N/A – the migration process maps the fields automatically.																												
	<table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>[PAGE UP]</td><td>[PAGE-UP]</td></tr><tr><td>[NUM LOCK]</td><td>[NUM-LOCK]</td></tr><tr><td>[SCROLL LOCK]</td><td>[SCROLL-LOCK]</td></tr><tr><td>[PAGE DOWN]</td><td>[PAGE-DOWN]</td></tr><tr><td>[CAPS LOCK]</td><td>[CAPS-LOCK]</td></tr><tr><td>[UP ARROW]</td><td>[UP-ARROW]</td></tr><tr><td>[LEFT ARROW]</td><td>[LEFT-ARROW]</td></tr><tr><td>[RIGHT CLICK]</td><td>[MENU]</td></tr><tr><td>[RIGHT ARROW]</td><td>[RIGHT-ARROW]</td></tr><tr><td>[DOWN ARROW]</td><td>[DOWN-ARROW]</td></tr><tr><td>[ALT GR DOWN]</td><td>[ALT-GR DOWN]</td></tr><tr><td>[ALT GR UP]</td><td>[ALT-GR UP]</td></tr><tr><td>[\$]</td><td>[DOLLAR]</td></tr></table>		10.x/11.x	A2019	[PAGE UP]	[PAGE-UP]	[NUM LOCK]	[NUM-LOCK]	[SCROLL LOCK]	[SCROLL-LOCK]	[PAGE DOWN]	[PAGE-DOWN]	[CAPS LOCK]	[CAPS-LOCK]	[UP ARROW]	[UP-ARROW]	[LEFT ARROW]	[LEFT-ARROW]	[RIGHT CLICK]	[MENU]	[RIGHT ARROW]	[RIGHT-ARROW]	[DOWN ARROW]	[DOWN-ARROW]	[ALT GR DOWN]	[ALT-GR DOWN]	[ALT GR UP]	[ALT-GR UP]	[\$]	[DOLLAR]
	10.x/11.x		A2019																											
	[PAGE UP]		[PAGE-UP]																											
	[NUM LOCK]		[NUM-LOCK]																											
	[SCROLL LOCK]		[SCROLL-LOCK]																											
	[PAGE DOWN]		[PAGE-DOWN]																											
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	[UP ARROW]		[UP-ARROW]																											
	[LEFT ARROW]		[LEFT-ARROW]																											
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	[RIGHT ARROW]		[RIGHT-ARROW]																											
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	[ALT GR DOWN]		[ALT-GR DOWN]																											
	[ALT GR UP]		[ALT-GR UP]																											
[\$]	[DOLLAR]																													
In 10.x/11.x, the delay time is divided by the total characters and applied between each character stroke. In A2019, the delay you specify applies to the time between each keystroke.																														
If the Encrypt Keystrokes option is selected in 11.x or 10.x bots, after migration the value is stored in the Credential Vault. The migration process creates a locker in the Credential Vault with the following attributes:																														
Name of the locker created in Enterprise A2019 is name <code>AAE_<folder_name></code> (folder_name is the folder in which the migrated bot is available).																														
The migrated bot uses this locker. Users who have any permission for the folder that contains the bot can access the locker. The migration run-as user must have the Create standard attributes for a credential permission.																														
A locker contains only one credential for each bot. The name of the credential created is <code>Keystrokes_<bot_name></code> for the TaskBots and <code>Keystrokes_<Metabot_name>_<Logic_name></code> for MetaBots.																														
Attributes for the locker are created with the name <code>Encrypted_keystrokes</code>.																														
If a locker, credential, or attribute with the same name is already available, the system appends the locker name, credential name, and attribute name with a numeric value. For example, <code>AAE_<folder_name>_1</code> , <code>Keystrokes_<bot_name>_1</code> , and <code>Encrypted_keystrokes_1</code> respectively. If name of the locker, credential, or attribute is longer than 50																														

Package	How it is migrated to A2019	What you need to do
Launch Website	This command is migrated to Launch website of the Browser package in A2019. Commands with "Edge" or "Override default browser" option deselected in the legacy product is automatically changed to use Default Browser after migration. 11.x bots that open a website in a new browser window can be migrated to Enterprise A2019. See Browser package on page 540.	N/A – the migration process maps the fields automatically.
Log to File	This command is migrated to Log to file action in A2019. See Log To File package on page 686.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
Loop	The following list explains how various iterator conditions of Loop are migrated to A2019. • Loop with Times is migrated to loop with For n times iterator of the Loop package. • Loop with List is migrated to loop with For n times iterator of the Loop package. • Loop with Each Row in an Excel Dataset is migrated to loop with For each row in worksheet iterator of the Excel Advance package. The system variable \$Excel Column\$ used inside the loop is now a user defined variable specified in the same iterator. • Loop with Each Row In A SQL Query Dataset is migrated to loop with For each row in a SQL query Dataset iterator of the Database package. The system variable \$Dataset Column\$ used inside the loop is now a user defined variable specified in the same iterator. • Loop with Each File In A Folder is migrated to loop with For each file in a folder iterator of the File package. The system variables \$Filename\$ and \$Extension\$ are now keys name and extension of a dictionary variable specified in the same iterator. • Loop with Each Folder In A Folder is migrated to loop with For each folder in a folder iterator of the Folder package. The system variable \$Folder name\$ used inside the loop is now a user defined variable specified in the same iterator. • Loop with Each Row In A CSV/Text File is migrated to loop with For each row in CSV/TXT iterator of the CSV/TXT package. The system variable \$Filedata Colum\$ used inside the loop is now a user defined variable specified in the same iterator. • Loop with Each Email Message On Mail Server is migrated to loop with For each mail in mailbox iterator of the Email package. The system variables \$Email Cc\$, \$Email From\$, \$Email Message\$, \$Email Received Date\$, \$Email Received Time\$, \$Email Subject\$, and \$Email To\$ are now keys emailCc, emailFrom, emailMessage, emailReceivedDate, emailReceivedTime, emailSubject, and emailTo respectively of a dictionary variable specified in the same iterator. • Loop with Each Node In An XML Database is migrated to loop with For each node in an XML database iterator of the XML package. The system variable \$XML Data Node\$ used inside the loop is now a user defined variable specified in the same iterator. • The following commands configured with the "Show child and hidden windows" option selected are migrated to the A2019 Legacy Automation package: • Loop > Condition > Window Exists • Loop > Condition > Window Does Not Exist	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
Loop > Condition > Variable	Variable containing string conditions We migrate IF with the following operators as a String condition in A2019: • = • < > • Include • Does not Include For the Random variable of the String sub-type, A2019 adds the Generate random string action of the String package to generate a random string above the If condition and assigns the value to the respective migrated variable. Variable containing number conditions We migrate IF with the following operators as a Number condition in A2019: • >= • <= • > • < For the Random variable of the Number sub-type, A2019 adds the Assign a random number action of the Number package to generate a random string above the If condition and assigns the value to the respective migrated variable. Variable containing date conditions The system tries to evaluate if a condition on a variable has a date value. If found, it migrates IF with the Datetime condition in A2019. Otherwise, the system migrates it as a string or number condition based on the operator used. In those cases, you must change it to a date condition after the bot migration if a date operation is involved. Additionally, you might also need to change the date format to one that is compatible with your data. The default format used to convert a date to string is <code>MM/dd/yyyy HH:mm:ss</code>. List type variable Loop on a variable condition of type List is migrated to either String or Number condition based on the operator used in the condition. The system uses the list index to validate the condition.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do																
Loop > Condition (other)	Refer to the table below to see how various conditions are migrated to the respective A2019 conditions. <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Web Control Exists or Web Control Does Not Exist</td><td>Migrated to the equivalent If condition of the Legacy Support package.</td></tr><tr><td>Object Properties</td><td>Migrated to the Object condition of the Recorder package.</td></tr><tr><td>Application Running or Application Not Running</td><td>Migrated to the equivalent If condition of the Application package.</td></tr><tr><td>File Exists, File Does Not Exist, File Date, File Size</td><td>Migrated to the equivalent If condition of the File package.</td></tr><tr><td>Folder Exists or Folder Does Not Exist</td><td>Migrated to the equivalent If condition of the Folder package.</td></tr><tr><td>Ping Successful Or Ping Unsuccessful</td><td>Migrated to the equivalent If condition of the Ping package.</td></tr><tr><td>Service is running or Service is not running</td><td>Migrated to the equivalent If condition of the Service package.</td></tr></table> Web Control Exists or Web Control Does Not Exist Loop with Web control exists and Web control does not exist conditions are migrated to Loop > While conditions Web control exists and Web control does not exist of the Legacy Automation package respectively.	10.x/11.x	A2019	Web Control Exists or Web Control Does Not Exist	Migrated to the equivalent If condition of the Legacy Support package.	Object Properties	Migrated to the Object condition of the Recorder package.	Application Running or Application Not Running	Migrated to the equivalent If condition of the Application package.	File Exists, File Does Not Exist, File Date, File Size	Migrated to the equivalent If condition of the File package.	Folder Exists or Folder Does Not Exist	Migrated to the equivalent If condition of the Folder package.	Ping Successful Or Ping Unsuccessful	Migrated to the equivalent If condition of the Ping package.	Service is running or Service is not running	Migrated to the equivalent If condition of the Service package.	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019																	
Web Control Exists or Web Control Does Not Exist	Migrated to the equivalent If condition of the Legacy Support package.																	
Object Properties	Migrated to the Object condition of the Recorder package.																	
Application Running or Application Not Running	Migrated to the equivalent If condition of the Application package.																	
File Exists, File Does Not Exist, File Date, File Size	Migrated to the equivalent If condition of the File package.																	
Folder Exists or Folder Does Not Exist	Migrated to the equivalent If condition of the Folder package.																	
Ping Successful Or Ping Unsuccessful	Migrated to the equivalent If condition of the Ping package.																	
Service is running or Service is not running	Migrated to the equivalent If condition of the Service package.																	
Loop (supporting commands)	The following table shows the Loop commands supported for migration and their respective mappings in A2019. <table><tr><th>10.x/11.x Command</th><th>A2019 Actions</th></tr><tr><td>Exit Loop</td><td>Break</td></tr><tr><td>Continue</td><td></td></tr></table>	10.x/11.x Command	A2019 Actions	Exit Loop	Break	Continue		N/A – the migration process maps the fields automatically.										
10.x/11.x Command	A2019 Actions																	
Exit Loop	Break																	
Continue																		
Message Box	This command is migrated to Message box action in A2019. See Message box package on page 694.	N/A – the migration process maps the fields automatically.																

Package	How it is migrated to A2019	What you need to do
Object Cloning	This command is migrated to the Recorder package > Capture action in A2019. Migration is supported for the following technologies: Migration is supported for applications using the following technologies (including when they are within a Citrix environment): • MSAA (Standard desktop technology) • Google Chrome browser • Internet Explorer browser • Java desktop • Web Java • UI Automation (advanced) The 10.x/11.x GetAllChildrenName and GetAllChildrenValue actions return string type variable values. In A2019, they return list values. The migration process joins the list values and stores them into a string variable to maintain consistent bot behaviors across releases. Object Cloning with the Export to CSV action in 10.x/11.x is migrated into the following packages/actions combinations because the action does not exist in A2019: • The Capture action saves the captured data into a table variable. • The Write to file action of the Data table package is then used to save the data from the table variable to the CSV file. If an action in the legacy Object Cloning command is disabled, the corresponding action in the migrated bot is also disabled. The window title is copied from the source command to the destination action. In 11.x, the command is used to capture the control in an image, whereas in A2019 the entire window image is captured with the control highlighted using a red rectangle. The X, Y coordinates and window title are also migrated to A2019. The Coordinate and Image execution or play modes from 11.x are migrated as the following actions because only object-based execution is supported in A2019. Play mode as coordinates: • Mouse click actions: The Click, Right Click, Left Click, Middle Click, and Double Click actions are migrated in the Mouse: Click action as a combination of Button and Events. The corresponding mouse buttons with events are migrated as shown: • Click changes to Left Button-Click • Right Click changes to Right Button-Click • Left Click changes to Left Button-Click • Middle Click changes to Middle Button-Click	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do																
OCR	All commands of OCR are migrated to equivalent A2019 actions of the OCR package. There is no change in behavior or command name. See OCR package on page 700.	N/A – the migration process maps the fields automatically.																
Open Program/File	This command is migrated to the Open program/file action of the Application package. In 10.x/11.x, this command does not throw an error if you provide an incorrect value in the Start In field. A2019 validates the value entered for the same field and throws an error during bot execution. See Application package on page 536.	Users must change the bot accordingly if they want to continue even if the Start In value field is incorrect.																
PDF	Migration is supported for the following PDF commands.<table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Merge Document</td><td>Merge document</td></tr><tr><td>PDF to Image</td><td>Extract image</td></tr><tr><td>Extract Form Fields</td><td>Extract field</td></tr><tr><td>Extract Text</td><td>Extract text</td></tr><tr><td>Split Documents</td><td>Split documents</td></tr><tr><td>Encrypt Document</td><td>Encrypt document</td></tr><tr><td>Decrypt Document</td><td>Decrypt document</td></tr></table> If the 11.x bot uses the Extract Form Fields command and stores values in the Credential Vault, the migration process migrates these values in the Enterprise A2019 Credential Vault. See PDF package on page 733. The output of a 11.x bot is mapped with multiple variables in the equivalent actions of the PDF package after that bot is migrated to Enterprise A2019. This reduces the number of actions in the migrated bot because a separate action is no longer required to map output to a variable.	10.x/11.x	A2019	Merge Document	Merge document	PDF to Image	Extract image	Extract Form Fields	Extract field	Extract Text	Extract text	Split Documents	Split documents	Encrypt Document	Encrypt document	Decrypt Document	Decrypt document	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019																	
Merge Document	Merge document																	
PDF to Image	Extract image																	
Extract Form Fields	Extract field																	
Extract Text	Extract text																	
Split Documents	Split documents																	
Encrypt Document	Encrypt document																	
Decrypt Document	Decrypt document																	
PGP	All commands of PGP are migrated to equivalent A2019 actions of the PGP package. There is no change in behavior or command name.	N/A – the migration process maps the fields automatically.																
Play Sound	All commands of Play Sound are migrated to its equivalent actions of the Sound package in A2019. A2019 supports only .mp3 and .wav file types in Play media file action. See Play Sound package on page 743.	N/A – the migration process maps the fields automatically.																

Package	How it is migrated to A2019	What you need to do										
Printer	Default Printer, Remove Printer, and Select Default Printer are migrated to the equivalent actions of the Printer package in A2019. See Printer package on page 743.	N/A – the migration process maps the fields automatically.										
Prompt	All commands of Prompt are migrated to equivalent A2019 actions of the Prompt package. The following table shows commands that can be migrated with name changes. <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>Prompt For Value</td><td>Converts to the For value action. In addition, Simulate keystroke action is added below the For value action to perform the keystrokes on the specific window title. This is to retain the execution behavior of old bots.</td></tr><tr><td>Prompt for File</td><td>For file</td></tr><tr><td>Prompt for Folder</td><td>For folder</td></tr><tr><td>Prompt For Yes/No</td><td>For yes/no</td></tr></table> See Prompt package on page 745.	10.x/11.x	A2019	Prompt For Value	Converts to the For value action. In addition, Simulate keystroke action is added below the For value action to perform the keystrokes on the specific window title. This is to retain the execution behavior of old bots.	Prompt for File	For file	Prompt for Folder	For folder	Prompt For Yes/No	For yes/no	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019											
Prompt For Value	Converts to the For value action. In addition, Simulate keystroke action is added below the For value action to perform the keystrokes on the specific window title. This is to retain the execution behavior of old bots.											
Prompt for File	For file											
Prompt for Folder	For folder											
Prompt For Yes/No	For yes/no											
Read from CSV/TXT	The Read from CSV/Text is converted to Open, Read, and Close actions in the A2019 CSV/TXT package. If your 10.x/11.x bot is using a variable as a session name and the Loop action used to read all rows of the CSV/TXT is using a hard-coded session name instead of a variable, then you must review the migrated bot and set the output variable of the CSV/TXT > Read action in the respective loop. Otherwise, you will get a UI error when you edit the A2019 bot.	Review the migrated bot and set the output variable of the CSV/TXT > Read action in the respective loop.										
REST Web Services	The Save Header To option in 11.x is migrated to A2019. This option enables you to store the response header in the array and dictionary variables with the response header name as key and its header value as the value of the dictionary. In 11.x, the failure response is captured by default. In A2019, enabling the Capture failure response option captures the errors and adds to the response dictionary variable. When you migrate a 11.x bot to A2019, the Capture failure response option is enabled by default to capture the failure response of the migrated bot. REST Web Service package on page 760	N/A – the migration process maps the fields automatically.										

Package	How it is migrated to A2019	What you need to do
Run Logic	Run logic command is migrated to the Run action of the Task Bot package in A2019. Additionally, Error Handling with the Run Logic command is migrated to the Try and Catch block.	N/A – the migration process maps the fields automatically.
Run Script	The Run Script command is migrated to the Run Script action of the Legacy automation package.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do																						
SAP > GUI Automation command	This command is migrated to the Recorder package > Capture action in Enterprise A2019. All object properties in the 11.x bots are mapped with the equivalent properties in the migrated bots. The following table provides a list of SAP objects and the actions that can be migrated to Enterprise A2019. <table><tr><th>Object</th><th>Action</th></tr><tr><td>Text box</td><td>Set Text, Append Text, Left Click, Right Click, Double Click</td></tr><tr><td>Combo box</td><td>Select Item By Text, Select Item By Index, Get Total Items, Get Selected Item Text, Get Selected Item Key, Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr><tr><td>Check box</td><td>Check, Uncheck, Toggle, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr><tr><td>Button</td><td>Click, Get Property, Left Click, Right Click, Double Click</td></tr><tr><td>Radio button</td><td>Select, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr><tr><td>Menu bar</td><td>Select Item By Text, Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr><tr><td>Tree</td><td>Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text</td></tr><tr><td>Label</td><td>Click, Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr><tr><td>Tab</td><td>Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text</td></tr><tr><td>Rest of the control</td><td>Get Property, Set Focus, Left Click, Right Click, Double Click</td></tr></table>	Object	Action	Text box	Set Text, Append Text, Left Click, Right Click, Double Click	Combo box	Select Item By Text, Select Item By Index, Get Total Items, Get Selected Item Text, Get Selected Item Key, Get Property, Set Focus, Left Click, Right Click, Double Click	Check box	Check, Uncheck, Toggle, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click	Button	Click, Get Property, Left Click, Right Click, Double Click	Radio button	Select, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click	Menu bar	Select Item By Text, Get Property, Set Focus, Left Click, Right Click, Double Click	Tree	Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text	Label	Click, Get Property, Set Focus, Left Click, Right Click, Double Click	Tab	Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text	Rest of the control	Get Property, Set Focus, Left Click, Right Click, Double Click	N/A – the migration process maps the fields automatically.
Object	Action																							
Text box	Set Text, Append Text, Left Click, Right Click, Double Click																							
Combo box	Select Item By Text, Select Item By Index, Get Total Items, Get Selected Item Text, Get Selected Item Key, Get Property, Set Focus, Left Click, Right Click, Double Click																							
Check box	Check, Uncheck, Toggle, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click																							
Button	Click, Get Property, Left Click, Right Click, Double Click																							
Radio button	Select, Get Status, Get Property, Set Focus, Left Click, Right Click, Double Click																							
Menu bar	Select Item By Text, Get Property, Set Focus, Left Click, Right Click, Double Click																							
Tree	Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text																							
Label	Click, Get Property, Set Focus, Left Click, Right Click, Double Click																							
Tab	Get Property, Set Focus, Left Click, Right Click, Double Click, Get total items, Get selected index, Get selected text, Select item by index, Select item by text																							
Rest of the control	Get Property, Set Focus, Left Click, Right Click, Double Click																							

Package	How it is migrated to A2019	What you need to do																					
Send Email	In 10.x/11.x, the Send Email command uses user-specific email settings stored as credential attributes within the system locker. When the first bot is migrated, we create a custom locker called AAE_Email and add the AAE_EmailSettings credential with the Username and Password attributes to it. Additionally, we create Global Values for the non-credential attributes, such as Server host, port, SSL and authentication, which correspond to the same Email Settings. 10.x/11.x Email Settings credentials are split into Credential Variable and Global Values in A2019, so during the migration process, email settings are migrated as follows: <table border="1"> <thead> <tr> <th>10.x/11.x Email Settings</th><th>A2019 Email Settings</th><th>A2019 Storage Type</th></tr> </thead> <tbody> <tr> <td>Host</td><td>AAE_EmailSettings_host</td><td>Global Value of type String</td></tr> <tr> <td>Port</td><td>AAE_EmailSettings_port</td><td>Global Value of type Number</td></tr> <tr> <td>Use secure connection (SSL/TLS)</td><td>AAE_EmailSettings_ssl</td><td>Global Value of type Boolean</td></tr> <tr> <td>My server requires authentication</td><td>AAE_EmailSettings_auth</td><td>Global Value of type Boolean</td></tr> <tr> <td>Username</td><td>userName</td><td>Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker</td></tr> <tr> <td>Password</td><td>password</td><td>Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker</td></tr> </tbody> </table>	10.x/11.x Email Settings	A2019 Email Settings	A2019 Storage Type	Host	AAE_EmailSettings_host	Global Value of type String	Port	AAE_EmailSettings_port	Global Value of type Number	Use secure connection (SSL/TLS)	AAE_EmailSettings_ssl	Global Value of type Boolean	My server requires authentication	AAE_EmailSettings_auth	Global Value of type Boolean	Username	userName	Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker	Password	password	Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker	N/A – the migration process maps the fields automatically.
10.x/11.x Email Settings	A2019 Email Settings	A2019 Storage Type																					
Host	AAE_EmailSettings_host	Global Value of type String																					
Port	AAE_EmailSettings_port	Global Value of type Number																					
Use secure connection (SSL/TLS)	AAE_EmailSettings_ssl	Global Value of type Boolean																					
My server requires authentication	AAE_EmailSettings_auth	Global Value of type Boolean																					
Username	userName	Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker																					
Password	password	Credential attribute within AAE_EmailSettings credential assigned to AAE_Email locker																					
Services	All commands of Services are migrated to equivalent A2019 actions of the Service package. There is no change in behavior or command name.	N/A – the migration process maps the fields automatically.																					

Package	How it is migrated to A2019	What you need to do																								
SOAP Web Service	This package behaves the same in A2019. If a SOAP web service is configured to call REST APIs, then we migrate them to the REST web service action instead of the SOAP web service action. Based on additional XML operations, we add actions from the XML package to make sure the migrated bot gives same result as the legacy bot. See SOAP Web Service package on page 793.	N/A – the migration process maps the fields automatically.																								
String Operation	The 11.x or 10.x String Operation command is migrated to equivalent actions of the String package. The following table shows the String Operation commands and their equivalent actions in Enterprise A2019. <table><tr><th>11.x or 10.x</th><th>Enterprise A2019</th></tr><tr><td>Before-After</td><td>Extract</td></tr><tr><td>Compare</td><td>Compare</td></tr><tr><td>Find</td><td>Find</td></tr><tr><td>Length</td><td>Length</td></tr><tr><td>Lower Case</td><td>Lowercase</td></tr><tr><td>Replace</td><td>Replace</td></tr><tr><td>Reverse</td><td>Reverse</td></tr><tr><td>Split</td><td>Split</td></tr><tr><td>Substring</td><td>Substring</td></tr><tr><td>Trim</td><td>Trim</td></tr><tr><td>Upper Case</td><td>Uppercase</td></tr></table> 11.x bots can use regular expressions in the Find and Replace commands to search for the string on which you want to perform an operation. The equivalent actions in Enterprise A2019 too can use regular expressions to search for the string on which you want to perform an operation. In 11.x, the system considers the new line character (/n) used in the variable when you use the Find and Replace commands. However, in A2019, the system does not consider the new line character when you use the Find and Replace commands.	11.x or 10.x	Enterprise A2019	Before-After	Extract	Compare	Compare	Find	Find	Length	Length	Lower Case	Lowercase	Replace	Replace	Reverse	Reverse	Split	Split	Substring	Substring	Trim	Trim	Upper Case	Uppercase	N/A – the migration process maps the fields automatically.
11.x or 10.x	Enterprise A2019																									
Before-After	Extract																									
Compare	Compare																									
Find	Find																									
Length	Length																									
Lower Case	Lowercase																									
Replace	Replace																									
Reverse	Reverse																									
Split	Split																									
Substring	Substring																									
Trim	Trim																									
Upper Case	Uppercase																									
System	Lock computer, Logoff, Restart, and Shutdown actions are migrated to the equivalent actions of the System package in A2019. See System package on page 800.	N/A – the migration process maps the fields automatically.																								

Package	How it is migrated to A2019	What you need to do								
Task	The following table shows the different commands that are migrated to the respective actions of the A2019 Task Bot package. <table><tr><th>10.x/11.x Command</th><th>A2019 Action</th></tr><tr><td>Pause</td><td>Pause</td></tr><tr><td>Stop Task</td><td>Stop</td></tr><tr><td>Run Task</td><td>Run. The output returned by the child bots is mapped to the respective variable in the parent bots.</td></tr></table>	10.x/11.x Command	A2019 Action	Pause	Pause	Stop Task	Stop	Run Task	Run. The output returned by the child bots is mapped to the respective variable in the parent bots.	N/A – the migration process maps the fields automatically.
10.x/11.x Command	A2019 Action									
Pause	Pause									
Stop Task	Stop									
Run Task	Run. The output returned by the child bots is mapped to the respective variable in the parent bots.									

Package	How it is migrated to A2019	What you need to do
Terminal Emulator	Encrypt text is not supported in the Send Text and Set Field actions for A2019. We recommend that you use Credential Vault instead of plain text. In 11.x and in Enterprise A2019: • Bots that use the following terminal model can be migrated to Enterprise A2019: • VT 220 model of the VT Series terminal type • IBM 5555 B01 and C01 models of the TN 5250 terminal type • A session (used to establish a connection with the terminal server) can be shared between the parent bot and a child bot. You can close a session from the child bot instead of closing the session from the parent bot. • You can use the Default terminal in bots for the VT100 terminal type. • Bots that send Japanese text using the Send Text command in 11.x with the DBCS option from the Encoding list and the Japanese Shift-JIS (932) option from the CodePage list selected in the Connect command can be migrated to Enterprise A2019. A2019 does not support legacy technology and by default supports all capabilities of Advance Technology of the 10.x/11.x bots. The maximum index value in A2019 is 99999. The migration process automatically updates the value of Field index in the Set Field action to 99999 to meet the maximum value restriction. If the index value is higher than 99999 and is used in a variable, then you must change it manually. The SSHI feature is not yet supported in A2019. The Search field action enables you to search for field index or field name by using a text. Bots created in 11.x no longer shows the Trying... text after the bots are migrated to Enterprise A2019. See Terminal Emulator package on page 808.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
Variable Operation (Assign)	Value type variables The functionality for this command has been divided into multiple packages in A2019. In 10.x/11.x, this command was performing assignment operations for all the supported datatypes. A2019 has built a dedicated Assign action for each data type. The migration process handles the mapping of the corrected packages and action based on the assignment that the respective variable operation is performing. List type variables Operations involving on list assignments are migrated to the Set item of the List package. If the operation has a fixed value, the system creates a temporary variable and stores the fixed value in it. You can then use this temporary variable in the Assign action of the List package to save it. Array type variables Operations involving on array assignment is migrated to Set value of a single cell action of the Datatable package to set a value for specific rows and columns. Dictionary type variables Operations involving dictionary assignment is migrated to the Put action of the Dictionary package to set the value for a specific key. If the key is a combination of a variable and fix value (for example <code>\$Dictionary(key-\$id\$)</code>), then the String package > Assign action is added to get the actual key. System variable \$Date\$ The 10.x/11.xVariable Operation command that uses the \$Date\$ system variable is migrated to A2019 by adding new date actions based on the operation being performed using \$Date\$. The migration process also converts the date value to a default string format – <code>mm/dd/yyyy HH:mm:ss</code>. Random variable of sub type string We migrate and map directly.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
Variable Operation (Reinitialize)	List variable For the Variable Operations command that reinitialize the list variable in 10.x/11.x, the migration process creates a temporary list variable with new values and assign it to the destination list variable in A2019. List variable declared by reading a Text file This command is migrated to the Import list from text file action in the Legacy Automation package.  Note: In A2019, the bot encounters an error if the source file is empty or does not contain a key for initializing the list variable, unlike in 10.x or 11.x. Array variable declared by reading a Text file The Array variable type is migrated as a Table variable type in A2019. The system uses the CSV/TXT package to read and load the respective data into the table variable in the bot. Dictionary variable The migration process creates a temporary dictionary variable to store all keys and values. Then the system uses the Dictionary package > Assign action to update the target variable with the keys and values from the temporary dictionary variable. Dictionary variable declared by reading a Text file The migration process addresses this use case by adding actions to read the CSV file using the CSV/Text package and storing the data in a table variable. Then it adds actions to perform a loop on the table variable and uses the Dictionary package > Put action to add keys and values into the dictionary variable. Array variable declared by reading an Excel/CSV file The migration process addresses this use case by migrating the Array variable type as a Table variable type in A2019. The system adds Open, Get Multiple Cells, and Close actions of the Excel Advance package and populates the table variable.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do
Variable Operation (resetting system variables)	The following system variables are migrated as user defined variables in A2019. The system adds a respective action to clear the value of the equivalent variable created in A2019. • Email Cc • Email From • Email Message • Email Received Date • Email Received Time • Email Subject • Email To • Error Description • Error Line Number	N/A – the migration process maps the fields automatically.
Wait	Wait for window and Wait for screen change in A2019 throws an exception error if the respective window is not open/close in the specified time or the screen is not found in specified time. In these cases, the system adds try and catch block if the command was configured to stop the bot and adds the Stop task action in the catch block. This is to ensure that the execution behaviour of migrated bots is the same as 10.x/11.x. Because we are migrating commands with the Stop bot action is encapsulated with the try and catch block in A2019, the bot also stops if the action fails due to some other reason. During the migration process, the Stop bot action also adds extra error handlers in the migrated bots when the Stop the task option is selected. The Wait for window action can have negative values for coordinates that are not supported in A2019. The negative values are changed to 0 during the migration process.	N/A – the migration process maps the fields automatically.
Web Recorder	All commands (except those mentioned below explicitly) of Web recorder are migrated to respective actions within the Legacy Automation package in A2019. The Legacy Automation package ensures that the migrated bots give the same results as 10.x/11.x. However, it is not recommended to use the Legacy Automation package for new development. Find broken links is migrated to Browser > Find broken links package. Additionally, 10.x/11.x has the "Find broken links timeout" and "Find broken links" options within the Tools > Options. A2019 has these options as part of the action and the timeout defaults to 10 seconds and the number of parallel threads value defaults to 10. Download files is migrated to Browser > Download files package. During the migration process, the Extract table action adds extra error handlers in the migrated bots when the On error continue with next action check box is enabled.	N/A – the migration process maps the fields automatically.

Package	How it is migrated to A2019	What you need to do														
Window Action	All commands of Windows Actions are migrated to its equivalent actions of the Window package in Enterprise A2019. 11.x bots can use regular expressions in the Get Active Window Title, Activate Window, Maximize Window, Minimize Window, Close Window, and Resize Window commands to search for the window on which you want to perform an operation. The equivalent actions in Enterprise A2019 too can use regular expressions to search for the window on which you want to perform an operation. See Window package on page 828.	N/A – the migration process maps the fields automatically.														
XML	All commands of XML are migrated to its equivalent actions of the XML package in A2019. The following command name have changed. <table><tr><th>10.x/11.x</th><th>A2019</th></tr><tr><td>End XML session</td><td>End session</td></tr><tr><td>Start XML session</td><td>Start session</td></tr><tr><td>Delete Node/Attribute</td><td>Delete node</td></tr><tr><td>Update Node/Attribute</td><td>Update node</td></tr><tr><td>Get nodes action with the "Single Nodes" option selected</td><td>Get single node action</td></tr><tr><td>Get nodes action with the "Multiple Nodes" option selected</td><td>Get multiple node action</td></tr></table> 11.x bots that extract nodes that contain namespace from an XML file can be migrated to Enterprise A2019. If you add a namespace to a node in an XML file, you must save and reload the XML file to reflect the changes. See XML package on page 833.	10.x/11.x	A2019	End XML session	End session	Start XML session	Start session	Delete Node/Attribute	Delete node	Update Node/Attribute	Update node	Get nodes action with the "Single Nodes" option selected	Get single node action	Get nodes action with the "Multiple Nodes" option selected	Get multiple node action	N/A – the migration process maps the fields automatically.
10.x/11.x	A2019															
End XML session	End session															
Start XML session	Start session															
Delete Node/Attribute	Delete node															
Update Node/Attribute	Update node															
Get nodes action with the "Single Nodes" option selected	Get single node action															
Get nodes action with the "Multiple Nodes" option selected	Get multiple node action															

Variable mapping for migration

Some variables map directly from previous product versions to A2019 while others behave differently or contain configuration changes.

- [User defined variables](#)
- [System variables](#)
- [Credential variables](#)

User defined variables

In A2019, all variables defined in bots are created as "Use input" or "Use output" types during migration to exchange values between parent bots and child bots.

The following table provides information about the user defined variable types and how they are migrated to A2019.

Legacy Variable Type	How it is migrated to A2019	What you need to do
Array	Sub-type value These variables are migrated to Table with all column values as String. Sub-type "Read from text file" These variables are migrated to Table with all column values as String. The following actions are added as part the of migration process to configure data in the variable: • Open action from the CSV/TXT package, which opens the file for reading • Read action from the CSV/TXT package, which returns the value in the Table variable • Close action from the CSV/TXT package, which closes the file Sub-type "Read from database" Variables with this sub-type are migrated to the Table package with all column values as String. The following actions are added as part the migration process to fill in the variable: • Add the Connect action of the Database package with the respective connection string. • Add the Export to datatable action of the Database package to return the results to the datatable variable. • Add the Disconnect action of the Database package to disconnect the database. Sub-type "Read from Excel/CSV file" These variables are migrated to Table with all column values as String. The following actions are added as part the of migration process to configure data in the variable: • Open action from the Advance Excel package, which opens the file for reading • Get multiple cells action from the Advance Excel package, which returns the Table variable value if All Cells or Range option is chosen in the variable declaration • Read now action from the Advance Excel package, which returns the Table variable value if the Entire Row option is chosen in the variable declaration • Read column action from the Advance Excel package, which returns the Table variable if the Entire Column option is chosen in the variable declaration. Additionally, the Assign list to datatable of list package is used to store the returned valued to the variable.	In A2019, an empty table variable returns a run time error. If your migrated bot contains an empty table variable, you must fix it in the A2019 environment.

Legacy Variable Type	How it is migrated to A2019	What you need to do
Dictionary	Sub-type Value The system migrates these variables to the Dictionary type with the String sub-type in A2019. Sub-type "Read from CSV file" The migration process adds actions to read the CSV file using the CSV/Text package and stores the data in a table variable. It also adds actions to perform a loop on the Table variable and uses the Put action of the Dictionary package to add the key and values in the Dictionary variable. Dictionary keys are not case sensitive in 10.x/11.x, but they are in A2019. To maintain the bot execution resilience, the migration process converts all dictionary keys to lower case values. We use string express Lower case if a variable is used as a dictionary key to get the lower case key name. When the system passes a dictionary variable from an 11.x bot to a DLL function of a different type, the DLL function accepts the following as input types: UInt16, Int16, Int32, Int64, Int, Char, Single, Decimal, Float, Double, Boolean, bool, Byte, String, and Datetime	No action required from users

Legacy Variable Type	How it is migrated to A2019	What you need to do
List	Sub-type Value These variables are migrated to List with sub-type String. Sub-type Array These variables are migrated to List with sub-type String. Sub-type Reading from text file Where a variable that is declared by reading a file is called, the Import list from text file action of the Legacy automation package is added above the action being migrated. Declared as "Make Random" The List variable can be declared as "Make Random" in 10.x/11.x to return a random item from the list. The migration process adds the new Size action to the List package to get the list size and adds the Assign a random number action to the Number package to find the random position and use it to get a random list item. Additional comments - In 10.x/11.x, List is accessible without specifying any index. In A2019, you must specify the respective index to fetch the specific value from the list. For example, here is how List variables can be accessed by index: <pre>\$listVariable[0]\$</pre> where 0 represents the first value in the list. - Index position starts from with 1 in 10.x/11.x, whereas it starts with 0 in A2019. - In 11.x, when a list with a fixed index is used, the system returns the value available in the first index of the list. For example, consider that you have a list with values 1, 2, 3, and 4, and you use \$IntList (3) \$ to retrieve the value in the third index position of the list. The system returns the value available in the first index position of the list (1) instead of the specified index position (3). In A2019, the system return the value available in the specified index position (for the above example, it returns 3). 11.x bots that use such expressions with fixed indexes in the list and are migrated to A2019 return the value available in the specified index position. - If a list has 10 items and a loop is running for more than 10 times, then 10.x/11.x returns the first value of the list after the 10th iteration. In A2019, you get a runtime error indicating that <code>index is out of bounds</code> and you must fix the bot.	In A2019, an empty list variable used outside a loop returns a run time error. If your migrated bot meets this criteria, you must fix it in the A2019 environment.

Legacy Variable Type	How it is migrated to A2019	What you need to do
Random	When there is a Random variable of the sub-type String, the migration process adds the Generate random string action of the String package to generate a random string above the If condition and assigns the value to the respective migrated variable in A2019. When there is a Random variable of the sub-type Number, the migration process adds the Assign a random number action of the Number package to generate a random string above the If condition and assigns the value to the respective migrated variable in A2019.	No action required by users
Value	Sub-type Value These variables always migrates as String in A2019, even if it has number, boolean, or datetime values in it. Expression are used in A2019 to convert a string to other types if required. Sub-type Read from text file To maintain the bot execution integrity during migration, where a variable that is declared by reading a file is called, the n Import string from text file action of the String package is added just above the action being migrated. String package on page 794 Number package on page 698 Boolean package on page 537 Datetime package on page 569	No action required by users

System variables

In some use cases, system variables such as Error Line Number, Error Description, OS Name, and others return a different value in A2019. Bots using these variables in a decision making or string operation require a review post migration.

Some system variables used inside a loop are now user defined variable in the loop. In some instances, the user defined variable might require configuration in the migrated bot.

Some system variables become actions in A2019. Those actions are added just above the action that is using these variables.

If a variable is defined at the index position for the following system variables, you might need to fix the migrated bots because the migration process could not determine if the variable contains an index or column name. If you do not fix it, the bot might return a "Key not found in record" runtime error. The migration process treats the value of a variable as name, but if it is an index, you must change it accordingly.

- \$Filedata Column\$
- \$Dataset Column\$

- \$XML Data Node\$
- \$Excel Column\$

Following table provides information about the various system variables and how they are migrated to A2019. Some variables are now part of actions, some have become actions, and some are still known as system variables but has syntax changes.

System Variable	How it is migrated to A2019	What you need to do
\$Day\$	Becomes \$System:Day\$ in A2019	No action required by user
\$Month\$	Becomes \$System:Month\$ in A2019	No action required by user
\$Year\$	Becomes \$System:Year\$ in A2019	No action required by user
\$Date\$	Becomes \$System:Date\$ in A2019 The date format set for the variable in the 11.x or 10.x bot is stored in the AADefaultDateFormat global value.	No action required by user
\$Hour\$	Becomes \$System:Hour\$ in A2019	No action required by user
\$Minute\$	Becomes \$System:Minute\$ in A2019	No action required by user
\$Clipboard\$	Becomes \$System:Clipboard\$ in A2019	No action required by user
\$Machine\$	Becomes \$System:Machine\$ in A2019	No action required by user
\$MiliSecond\$	Becomes \$System:MiliSecond\$ in A2019	No action required by user
\$Dataset Column\$	This system variable is now part of the For each row in a SQL query dataset iterator in Loop. The system creates a new variable in the loop and uses it inside the loop wherever \$Dataset Column\$ is present.	No action required by user
\$Extension\$ and \$FileName\$	These system variables were used in the For each file in a folder iterator of Loop. However, in A2019, a dictionary type variable is used to capture the extension and file name, which can be retrieved with "extension" and "name" key name respectively. Loop package on page 687.	No action required by user

System Variable	How it is migrated to A2019	What you need to do
\$Email\$ \$Email From\$ \$Email Message\$ \$Email Received Date\$ \$Email Received Time\$ \$Email Subject\$ \$Email To\$	These system variables were used inside the For each mail in mail box iterator of Loop. In A2019, a dictionary type variable is used to capture all email values that can be retrieve with the respective keys. Using dictionary variable for email properties on page 597	No action required by user
\$FolderName\$	This system variable is used inside the For each folder in a folder iterator of Loop. In A2019, the value is returned to the string variable specified in the loop.	No action required by user
\$XML Data Node\$	This system variable is used inside the For each node in XML dataset iterator of Loop. In A2019, the value is returned to the string variable specified in the loop.	No action required by user
\$Counter\$	This system variable is deprecated in A2019. The migration process creates a user-defined variable type Number and modifies the bot to ensure it provides the same output as the 11.x bot. If you have used the \$Counter\$ variable in a loop, the migration process replaces the variable with the \$Condition-Counter\$ variable in the migrated bot and sets its value to 1.	No action required by user
\$ArrayColumns(\$ArrayVariable\$)\$	Becomes an expression in A2019: <code>\$ArrayVariable.DataTable:columnCount\$</code>	No action required by user
\$ArrayRows(\$ArrayVariable\$)\$	Becomes an expression in A2019: <code>\$ArrayVariable.DataTable:rowCount\$</code>	No action required by user
\$AAControlRoom\$	Becomes <code>\$System:AAControlRoom\$</code> in A2019	No action required by user
\$RAMUsage\$	Becomes <code>\$System:RAMUsage\$</code> in A2019	No action required by user
\$TotalRAM\$	Becomes <code>\$System:TotalRAM\$</code> in A2019	No action required by user
\$OSName\$	10.x/11.x returns the Microsoft Windows 10 Pro 64-bit value. In A2019, this variable becomes <code>\$System:OSName\$</code> and returns the Windows 10 64-bit.	No action required by user
\$CPUUsage\$	Becomes <code>\$System:CPUUsage\$</code> in A2019	No action required by user
\$Excel Cell Row\$	This system variable is migrated to the Get row number action of the Excel package in A2019 and added just above the action in which it is used.	No action required by user

System Variable	How it is migrated to A2019	What you need to do
\$Excel Cell Collumn\$	This system variable is migrated to the Get column name action of the Excel package in A2019 and added just above the action in which it is used. 10.x/11.x returns the first column (for example column A) for the \$Excel Cell Collumn\$ even if the active cell is not column A (for example column F10) inside a loop. In A2019, the same configuration returns the active cell (for example column F10). Below are the use cases that result in the above behavior change: • Excel is opened with or without "contains header" checked containing 10 rows. • Set active cell as F10 • A loop is performed to row read • Put a Message Box with \$Excel Cell Collumn\$ in it • Run the bot	Considering the behavior differences, you might need to change some bots.
\$Excel Cell\$	This system variable is migrated to the Get cell address action of the Excel package in A2019 and added just above the action in which it is used.	No action required by user
\$AATaskName	This system variable becomes \$System.AATaskName\$ in A2019. In 10.x/11.x, this variable returns the value to your computer path directory (for example Automation Anywhere\My Tasks\My Folder\My Folder2\AATaskName.atmx). In A2019, it returns the value to the bot path relative to the Enterprise Control Room (for example Bots/AATaskName).	Considering the values returned are different between the versions, you might need to change some bots.

System Variable	How it is migrated to A2019	What you need to do
\$AAApplicationPath\$	11.x specific: This 11.x system variable returns the path set by users in the Tool > Option setting of what is known as the "client application". In A2019, it becomes a global value. The migration process maps this change automatically and the value set of each user in 11.x is copied to the global value variable @AAApplicationPath. 10.x specific: This 10.x system variable does not automatically migrate to A2019 as a global value. Post migration, you must create the AAApplicationPath global value in A2019 and update it with the 10.x path. This update ensures that when you run the bot in A2019, the AAApplicationPath folder value is uniquely resolved for each user. For example, if the 10.x path value for AAApplicationPath is D:\John.Doe\My Documents\Automation Anywhere Files, then you must create the AAApplicationPath global value in A2019 and update with this path. See Global values on page 882.	No action required by user for 11.x because the system variable is automatically mapped as a global value during migration. 10.x users must create the AAApplicationPath global value in A2019 after migration. Ensure that the CAN be changed option is selected when creating the AAApplicationPath global value. Bot Creators and Bot Runners must set the value for the AAApplicationPath global value before they run the migrated bots.
\$AAInstallationPath\$	This system variable becomes \$System:AAInstallationPath\$ in A2019. In 10.x/11.x, it returns the Enterprise client installation path (for example C:\Program Files (x86)\Automation Anywhere\Enterprise\Client). In A2019, it returns the Bot agent installation path (for example C:\Program Files\Automation Anywhere\Bot Agent).	Considering the values returned are different between the versions, you might need to change some bots.

System Variable	How it is migrated to A2019	What you need to do
\$Date\$	This system variable becomes \$System:Date\$ in A2019. In 10.x/11.x, this variable returns the current date and time in a format specified in the <code>AA.Settings.XML</code> file. In A2019, \$System:Date\$ returns values of type Datetime and users must use an action to change it in to String. To minimize disruption to users, the migration process does the following to each \$Date\$ instance: - Creates a temp variable \$SystemDateInString\$ of type String. - Adds a ToString action of Datetime package to convert \$System:Date\$ to string with customer format as "MM/dd/yyyy HH:mm:ss" and store the output into above string variable. - Uses this string variable where ever \$Date\$ is used. - The above steps are repeated for each occurrence of \$Date\$. Depending on how your bot is configured, you might need to update the date/time configuration.	Change the bot if the date format is not "MM/dd/yyyy HH:mm:ss"
\$Current Directory\$	This system variable is deprecated in A2019 and automatically converted to a user defined variable during migration. Its value is set per the value defined in Loop > For each file in a folder and For each folder in a folder.	No action required by user
\$Error Line Number\$ \$Error Description\$	In 10.x/11.x, these system variables are used after the Error Handling command. In A2019, the value is returned to the user defined variables specified in the Catch action.	No action required by user
\$PDFFileName\$ \$PDFTitle\$ \$PDFAuthor\$ \$PDFSubject\$	In 10.x or 11.x, these system variables were used after any PDF command. In A2019, a Dictionary type variable is used to capture all PDF values that can be retrieve with the respective keys. Every PDF action returns this Dictionary variable with corresponding PDF values. Using a dictionary variable for PDF properties on page 740	No action required by user
\$System\$	In 11.x or 10.x, this system variable is used to retrieve information about a device's settings and its performance. In A2019, the Get environment variable action of the System package is used. Environment variables for System package on page 801	

System Variable	How it is migrated to A2019	What you need to do
\$WorkItem\$	\$WorkItem\$ is String Migrated as is. \$WorkItem\$ is Number - If it is displaying or logging a Number, the number is changed to a String - If it is displaying as a Number, migrate as a Number type \$WorkItem\$ is DateTime Migrate as is, but the migrated package results in an error, so you cannot migrate the package.	For the DateTime type, you cannot migrate the package yet, so the associated bot must be migrated at another time

Credential variables

The credential variables used for the Username and Password fields in 10.x and 11.x are migrated as Credential variables in A2019.

The method of migration differs for 10.x and 11.x.

To learn how 10.x credentials are migrated, see the section on credentials in [How 10.x data is copied to Enterprise A2019](#) on page 444.

The following describes how 11.x credentials are migrated to A2019.

The credential variables used in fields other than the Username and Password fields are migrated as Global Values. These fields include hostname, port number, and so on. The migrated global values have the following syntax: <credentialname>_<attributename>. For example in 11.x, a credential `FTPConnection` with an attribute `hostname` is migrated as `FTPConnection_hostname`.

The following table provides information about the packages and actions that support the migration of credential variables from 11.x to A2019:

Package	Actions
Active Directory	- Create and Modify User - Create and Modify Group - Create and Modify Object - Search - Get Property
Database	- Connect with connection string - Username - Password
Email Automation	- Hostname - Username - Password
Excel	Open Spreadsheet

Package	Actions
FTP / SFTP	Connect
Insert Keystrokes	All keystrokes that require use of credentials
Legacy Automation	Set Text in Manage Web Controls action
Manage Window Controls	- Set Text - Append Text
PDF	- PDF to Image - Extract Form Fields - Extract Text - Split, Encrypt, and Decrypt Document
PGP	- Encrypt and Decrypt Files - Create Keys
Recorder	- Set Text - Append Text  Note: Migrated from Object Cloning command as Capture action.
REST Web Service	- URI - Username - Password - Headers - Operation parameters  Note: Domain name is migrated as a global value.
SOAP Web Service	- Username - Password - Headers - Operation parameters - Raw data parameters
Terminal Emulator	- Connect command for SSH2 with User and Key file authentication options - Send Text - Set Field
Web Recorder	Manage Web Controls with Set Text and Append Text functions

Prerequisite tasks for migrating bots

After you have installed Enterprise A2019 On-Premises, you must perform certain tasks before migrating the 10.x or 11.x bots.

1. Create users who will migrate bots from the Enterprise Control Room. Grant these users the following permissions and folder permissions for the **Bots>My Tasks** and **My MetaBots** folder.
 Migrate bot user account: This account has access to the Administration > Migration page and can create a migration instance. Create a custom role that meets the following criteria:
 - Have the View Migration permission.
 - Have the Manage Migration permission.
 - Have permission on the 11.x folder containing the bots and MetaBots you want to migrate.
 - Be in a role that has access to Bot Runners that you want to select for running the migration (on the Administration > Migration > Run As page).
 - Have the View & edit ALL credentials attributes value permission. This permission is required if you are migrating bots that use the Send Email command and user specific email attributes.

Bot Runner user account: This account runs the migration and must be available for selection on the Administration > Migration > Run As page. This user account must meet the following criteria:

- Have an unattended Bot Runner license.
 - Have the Autologin Set status.
 - Have the Allow a bot-runner user to run migrations permission.
 - Have the Create folder permission.
 - Have the View package permission.
 - Have the Register device permission.
 - Have the Allow a bot-runner user to run migration permission.
 - Have the View my bots and Run my bots permissions
 - Have the Check-in and Check-out permissions for the **My Bots** and **My Metabots** folders in Enterprise A2019.
2. Install the Bot agent on the device that you want to use for migration.
[Install Bot agent and register device](#) on page 400
 3. Optional: To migrate the production version of bots, import the 11.x bots using the BLM feature from the SVN version control enabled 11.x Enterprise Control Room.
[Import bots](#) on page 1163

For 10.x: [Copy 10.x data](#) on page 442

For 11.x: [Migrate Enterprise bots](#) on page 495

Migrate Enterprise bots

The bot migration process converts 11.x or 10.x bots (TaskBots and MetaBots) in .atmx and .mbot format to the .bot format used in A2019 and uploads the successfully migrated bots to the Enterprise Control Room public workspace.

Ensure you have completed all the prerequisite tasks for migrating bots: [Prerequisite tasks for migrating bots](#) on page 495.

All manual dependencies of bots are automatically converted as Enterprise Control Room dependencies during migration. The Download Control Room file action downloads these dependencies from the Enterprise Control Room to the respective locations.

Migrating to A2019 is available for On-Premises deployment only.

1. Log in to your A2019 staging environment.
2. Click Administration > Migration.



Note: If you have migrated bots from 10.x to 11.x, the information about that migration is not displayed on the All migrations page.

3. Click Migrate bots.
4. Provide information on the General page.

Option	Action
Name	Enter a migration name or use the default one. The default migration name shows the name of the user who is logged in, current date, and time stamp.
Description	Enter a description for the migration.
Overwrite	Select this option to overwrite an existing bot if a bot with the same name exists in the folder.
Do not overwrite	Selecting this option does not migrate the bot if a bot with the same name exists in the folder.

5. Click Next.
6. Click Bots > My Tasks.
7. Select the bots (TaskBots and MetaBots) you want to migrate and click the right arrow.
The Last Migrated column indicates when the bot was migrated previously. N/A means the bot has not been migrated before.
8. Click Next.
9. Select one or more usernames from the list to run the migration and click the right arrow.
Usernames can display either the message `Picked at run time` or the device name in the Device column. A device name indicates the registered device for that user. `Picked at run time` is shown when a user does not have a default device, for example, a user who has not registered a device and a system administrator has assigned a device to that user.
 - Bots are distributed across selected Bot Runner users in a round-robin method.
 - The first Bot Runner user on the selected list is the first one used.
 - A parent bot and its dependencies are assigned to a single Bot Runner user.
10. Click Next.
11. Optional: Review the dependent TaskBots and MetaBots on the Bot and Dependent Bots page before you migrate them.

Dependent bots (TaskBots and MetaBots) are migrated before the primary bot.

The table shows the primary bot at the bottom and its dependencies above. For example, the following information means that `Sample05.atmx` has a dependency on `Sample04.atmx`, and `Sample04.atmx` has a dependency on `MessageBox.atmx` and `MetaTask.mbot`.

Type	Name	Path
MetaBot (mbot)	MetaTask.mbot	Bots\My Metabots \MetaTask.mbot

Type	Name	Path
TaskBot (atmx)	MessageBox.atmx	Bots\MyTasks\MessageBox.atmx
TaskBot (atmx)	Sample04.atmx	Bots\MyTasks\Sample04.atmx
TaskBot (atmx)	Sample05.atmx	Bots\MyTasks\Sample05.atmx

12. Click Next.
13. Optional: Select an option from the Validate permissions page to validate the permissions required by the user to perform the migration.

Option	Description
Myself	Validates the permissions assigned to the logged-in user who is initiating the migration.
The Run-as user	Validates the permissions assigned to the user (Run-as) you selected to run the migration in Step 9. The system uses this user to convert bots and perform the migration.
Both	Validates the permissions required by both users: the logged-in user who is initiating the migration and the Run-as user who will perform the migration.

14. Click Validate.

The system verifies if the required permissions are assigned to user you have selected.

Permissions required for logged-in user and Run-as user

The validation result provides information about any of the required permissions is not granted to the selected user. If any of the required permissions is not granted, you must grant those permissions and start the migration process again.



Note: The Migrate Bots option is not enabled until all the required permission are granted to the selected user.

15. Click the Migrate Bots option from the Migrate Bots menu.

The system starts migrating the selected bots and their dependent bots. A progress bar in the MIGRATION RESULTS tab shows the progress of the migration.

After the migration, the system uploads successfully migrated bots to the public workspace of the A2019 Enterprise Control Room (in the same folder in which the .atmx file is available). Only bot migrations initiated from the Enterprise Control Room are stored in the public workspace.

If the bot was enabled for analytics in 11.x, the associated Bot Insight data and the published dashboard are also migrated to the public workspace in the A2019 Enterprise Control Room.

To migrate the Bot Insight private dashboards associated with the analytics bot, check out the bot to the private workspace. After the bot is checked out for the first time, the private dashboards are migrated to A2019.

The All migrations page shows the current status of the migrated bot and other related information. You can also click the View migration option for each migration instance to see additional information such as any unsupported commands or attributes associated with the migrated bot and its dependencies.

You can view in-process migration activities from the Activity > In progress page.

[Verify the bot migration](#) on page 506 | [View migration reports](#) on page 507

Related tasks

[View migration reports](#) on page 507

Use the reports to analyze the status of individual bot migration, data migration, and audit log migration and identify the status and summary of the individual migration.

[Export 11.x Bot Insight dashboards for migration](#) on page 436

Use the Bot Insight pre-migration utility to export your 11.x Bot Insight dashboard metadata (widgets and layouts) and dashboard profile as a zip file. Run this utility in your 11.x device and paste the zip file in the Enterprise A2019 repository to migrate the Bot Insight dashboards.

How MetaBots are migrated

When you migrate a MetaBot to Enterprise A2019, equivalent bots are created for the various logic available in the MetaBot, except for application screens. After successful migration, each logic in a .mbot file is converted to a TaskBot files.

A MetaBot contains assets and logic. Assets are the application screens or DLLs that are used to automate a task on an application. Logic is a set of commands to perform an operation and interact with other logic and bots.

The migration process performs the following actions:

- Converts MetaBot logic to corresponding TaskBots.
- Maintains the folder structure of the MetaBots after it is migrated. The new folders created in Enterprise A2019 contain the TaskBots for each logic migrated to A2019.
- Updates the TaskBots that use MetaBot logic to refer to the new TaskBots that are created for the migrated MetaBot logic.

You do not have to update the TaskBots manually.

Features such as use of DLLs, input and output variables, and Execute permission which were available only for MetaBots are now available for all TaskBots.

We will use the following MetaBot to explain how it is migrated to A2019:

- MetaBot name: MetaTask
- Assets:
 - Login screen
 - General.dll
 - DLL\Binary.dll
- Logic:
 - Common
 - Logic\Connect
 - Logic\Disconnect
 - Logic\Operations\Numeric

MetaBot migration process

The system creates a folder with the same name as the MetaBot within the **My MetaBots** folder available in the **Bots** folder, and the same folder structure as 11.x is retained. For example, if the folder structure in 11.x is **Accounts/Tax/MetaTask.mbot**, the system retains the folder structure as **Accounts/Tax/MetaTask.mbot**. All the components of a MetaBot are stored in the folder created for that MetaBot. In this example, the system creates the **MetaTask** folder in the **Bots\My MetaBots** folder and stores all the components the MetaBot in that folder.

Migration of DLLs

The system does not maintain the folder structure for assets in order to maintain the references between the DLLs. For the above example, **General.dll** and **Binary.dll** are stored in the **MetaTask** folder although the **Binary.dll** is stored in the **DLL** subfolder.

Migration of screens

Each screen in a MetaBot is converted to a windows variable and the actions performed on the screen are migrated to the equivalent actions in Enterprise A2019.

The following table lists the screens that can be migrated to A2019:

Browser	Internet Explorer Google Chrome (supported for the objects captured using the object play type)
Screen type	Standard
Technology	Java, HTML, MSAA, .Net, UI Automation (supported for the objects captured using the object play type)
Play type	Object, Image, Coordinate

The following table provides information about the actions that are performed on an object play type object available on the screen is migrated to the equivalent actions in A2019:

Play type	11.x Action	A2019 Action
Object	Get Property, Get Total Items, Get Selected Index, Get Selected Text, Select Item by Text, Select Item by Index, Click, Left Click, Right Click, Double Click	Migrated to the Capture action of the Recorder package. The GetAllChildrenName and GetAllChildrenValue commands in 11.x/10.x return string type variable values. In A2019, they return list values. The migration process joins the list values and stores them into a string variable to maintain consistent bot behaviors across releases. The Object Cloning command with the Export to CSV action in 11.x/10.x is migrated to: - The Capture action of the Recorder package. This action saves the captured data into a table variable. - The Write to file action of the Data Table package. This action saves the data from the table variable to the CSV file.

The following table provides information about the actions that are performed on an image play type object available on the screen is migrated to the equivalent actions in A2019:

Play type	11.x Action	A2019 Action
Image	Left Click	Migrated to the Find window in window action of the Image Recognition package with the Left Click selected from the Action list.
	Right Click	Migrated to the Find window in window action of the Image Recognition package with the Right Click selected from the Action list.
	Double Click	Migrated to the Find window in window action of the Image Recognition package with the Double Click selected from the Action list.

Play type	11.x Action	A2019 Action
	Middle Click	Migrated to the Find window in window action of the Image Recognition package with the Left Click selected from the Action list.
	Set Text	Migrated to: - The Find window in window action of the Image Recognition package with the Left Click selected from the Action list. - The Delay action of the Delay package with the Regular delay set to 500 milliseconds. - The Simulate keystrokes action of the Simulate keystrokes package.
	Get Text	Migrated to the Capture area action of the OCR package.

The following table provides information about the actions that are performed on an coordinate play type object available on the screen is migrated to the equivalent actions in A2019:

Play type	11.x Action	A2019 Action
Coordinate	Click	Migrated to the Click action of the Mouse package with the Left Button and Click options selected.
	Left Click	Migrated to the Click action of the Mouse package with the Left Button and Click options selected.
	Right Click	Migrated to the Click action of the Mouse package with the Right Button and Click options selected.
	Middle Click	Migrated to the Click action of the Mouse package with the Middle Button and Click options selected.
	Double Click	Migrated to the Click action of the Mouse package with the Left Button and Double click options selected.

Play type	11.x Action	A2019 Action
	Set text	Migrated to: • The Click action of the Mouse package with the Left Button and Click options selected. • The Delay action of the Delay package with the Regular delay set to 500 milliseconds. • The Simulate keystrokes action of the Simulate keystrokes package.
	Get text	Migrated to: • The Click action of the Mouse package with the Left Button and Click options selected. • The Clear action of the Clipboard package. • The Delay action of the Delay package with the Regular delay set to 500 milliseconds. • The Simulate keystrokes action of the Simulate keystrokes package. • The Delay action of the Delay package with the Regular delay set to 500 milliseconds. • The Copy to action of the Clipboard package.

Migration of logic

Each logic in a MetaBot is converted to a TaskBot and each command used in a logic is converted to the equivalent action in A2019. The variable used in a logic is converted to an equivalent variable in A2019. If the Parameter Type of a variable is input or output, the same is maintained after that variable is migrated to A2019. For example, if the Parameter Type of the variable ABC is set as Input, the variable ABC created in A2019 has the Use as input option selected after it is migrated. The system retains the internal folder structure of the logics. For the above example, all the migrated logics are stored as listed in the following table:

Folder	Entry
MetaTask	Common
MetaTask\Logic	Connect

Folder	Entry
MetaTask\Logic	Disconnect
MetaTask\Logic\Operations	Numeric

Migration of Run Logic command

The Run Logic command is used in a bot to run a specific logic from a MetaBot in 11.x. When you migrate that bot, the Run Logic command is converted to the Run action of the Task Bot package.

The input variables are converted to equivalent variables in A2019 and the output variables are migrated to a dictionary variable. You use the key in the dictionary variable to use the associated value. The dictionary variable might contain other variable types, for example, list, value, integer, and array. You can map the variables available in the dictionary variable with other variable types. For example, you can map the list type variable available in the dictionary variable with the list, value, and array type variables.

Migration of Execute command

The DLLs in the MetaBots use the Execute command to run a function from that DLL. After migration to A2019, each Execute command is converted to Open, Run function, and Close actions of the DLL package. Information about which function to run from the DLL, which parameters to use, and other details in the Execute command is migrated to the Run action.

Starting from Enterprise A2019.16 (6448), you can migrate MetaBots that contain DLLs whose return types are different from that of the MetaBot. The following table provides information about the variable type of the output of the MetaBot and the return type of a DLL.

MetaBot variable type	DLL function return type
Value	Two-dimensional array, List, Byte in array (Byte[]), unsigned integers (UInt32, UInt64), signed integers, IDictionary, IList, and unsigned integers in array (UInt16[], UInt32[], UInt64[]), signed Byte
Array	Two-dimensional array, List, unsigned integers (UInt16[], UInt32, UInt64), signed integers, IList, signed Byte and IDictionary



Note: The migration of bots that uses IDictionary variable is supported, however, the migrated bots might not return the correct value. This behavior is same as in 11.x or 10.x.

The following table provides information about the variable type that is passed from the MetaBot and the input type a DLL accepts.

Variable type of MetaBot	Input variable type the DLL accepts
List	Two-dimensional array, list, byte, unsigned integers (UInt16, UInt32, UInt64), signed integers, signed Byte, byte in array (Byte[]), and unsigned integers in array (UInt16[], UInt32[], UInt64[])

Variable type of MetaBot	Input variable type the DLL accepts
Array	Two-dimensional array, list, byte, unsigned integers (UInt16, UInt32, UInt64), signed integers, signed Byte, byte in array (Byte[]), and unsigned integers in array (UInt16[], UInt32[], UInt64[])
Value	Byte, unsigned integers (UInt16, UInt32, UInt64), signed integers, signed Byte
Dictionary	Byte, unsigned integers (UInt16, UInt32, UInt64), signed integers, signed Byte

Enable schedules after migration

When you copy 10.x data to Enterprise A2019, the 10.x schedules are migrated. Version 11.x schedules are migrated when you update the 11.x data to Enterprise A2019.

After you migrate a bot associated with a schedule, the system automatically replaces the .atmx bot within that schedule with the Enterprise A2019 bot. Migrated schedules are inactive and do not have associated devices, so some dependencies must be remapped in the Enterprise A2019 environment.

To reenable migrated schedules, follow these steps:

1. Confirm that the bot linked to the schedule has been successfully migrated.
Migrated schedules only point to successfully migrated bots. If a bot migration fails, then the associated schedule continues pointing to the .atmx bot.
2. Install the Bot agent on your Bot Runner devices.
[Install Bot agent and register device](#) on page 400
3. Edit the schedule to add relevant devices.
[Schedule a bot](#) on page 1058
4. Enable the schedule by clicking Enable after you have provided the required information for scheduling a bot.
[Schedule a bot](#) on page 1058

Related concepts

[Migrate to Enterprise A2019](#) on page 430

Migrate to the latest Enterprise A2019 version from Automation Anywhere Enterprise versions 11.x or 10.x.

Related tasks

[Copy 10.x data](#) on page 442

You must copy the 10.x data to Enterprise A2019 before you convert the 10.x bots.

[Copy and paste 11.x information to A2019](#) on page 435

The 11.x server repository files and the credential vault file are required in the Enterprise A2019 environment. The most efficient way to get this data is to copy it from the 11.x environment into A2019.

[Migrate Enterprise bots](#) on page 495

The bot migration process converts 11.x or 10.x bots (TaskBots and MetaBots) in .atmx and .mbot format to the .bot format used in A2019 and uploads the successfully migrated bots to the Enterprise Control Room public workspace.

Pause and resume bot migration

You can pause and then resume the paused bot migration. You might want to pause a bot migration if you want to perform a high-priority task on the same Bot Runner device on which the bot migration is running.

You must have the required permissions to start bot migration.

- Pause and resume bot migration when only one Bot Runner is used for bot conversion:
 - a) Select the active bot migration you want to pause from the Activity > In progress page.
 - b) Click the pause icon in the bot Launcher or on the In progress page.
The system pauses the bot migration. The status of bot migration is listed on the following:
 - The Activity > In progress page and marked as paused.
 - The bot migration on the Administration > Migrations page, where the status is displayed as paused.
 - The Bot migration report tab, where the status of the bot that was being converted and the bot migration that was paused is set as paused. The status of all other bots that were not converted is set as pending.
 - c) Select the paused bot migration that you want to resume from the Activity > In progress page.
 - d) Click the resume icon in the bot Launcher or on the In progress page.
The system resumes the paused bot migration. The details status of the resumed bot migration is available on the following:
 - The Activity > In progress page where the status is marked as active.
 - The Administration > Migrations page where the status is marked as in progress.
 - The Bot migration report tab, where the status of the bot that was being converted and the bot migration was paused is set as in progress.
- Pause and resume bot migration on some of the Bot Runners when multiple Bot Runners are used for bot conversion:
 - a) Select the active bot migration you want to pause from the Activity > In progress page.
 - b) Click the pause icon on the toolbar to pause the selected migration processes.
The system pauses the selected migration processes that were running on various Bot Runners. The status of the paused bot migration is displayed on the Activity > In progress page and marked as paused.

There is no change in the status of the bot migration on the Administration > Migrations page and on the Bot migration report tab.
 - c) Select the paused bot migrations you want to resume from the Activity > In progress page.
 - d) Click the resume icon on the toolbar to resume the selected paused bot migration.
The system resumes the bot migration for the selected Bot Runners. The status of Bot Runners for which the bot migration is resumed is displayed on the Activity > In progress page and marked as active.

The status of the bot migration on the Administration > Migrations page is displayed as in progress.
- Pause a bot migration for all Bot Runners when multiple Bot Runners are used for bot conversion.

- a) Select all the active bot migration you want to pause from the Activity > In progress page.
- b) Click the pause icon on the toolbar to pause the selected bot migration.
The system pauses the selected bot migrations that were running on various Bot Runners. The entry for all the paused migration processes is available on the following:
 - The Activity > In progress page and marked as paused.
 - The Administration > Migrations page where it is displayed as paused.
 - The Bot migration report tab, where the status of the bots for which migration has not started is set as paused.
- c) Select all the paused bot migration you want to resume from the Activity > In progress page.
- d) Click the resume icon in the bot Launcher or on the In progress page for all Bot Runners.
The system resumes the paused the bot migration. The status for all the Bot Runners is available on the following:
 - The Activity > In progress page and marked as active.
 - The Administration > Migrations page where it is displayed as in progress.
 - The Bot migration report tab, where the status of the bot that was being converted and the bot migration was paused is set as in progress.

Stop bot migration

You can stop an in-progress bot migration if that bot migration is not progressing or is not responding.

You must have the required permissions to start bot migration.

1. Select the active bot migration that you want to stop from the Activity > In progress page.
2. Click the stop icon in the bot Launcher or on the In progress page.
The system immediately terminates the bot migration. The status of the stopped bot migration is listed on the following:
 - The Activity > Historical page and marked as failed.
 - The Administration > Migrations page, where it is displayed as unsuccessful.
 - The Bot migration report tab, where the status of the bot that was being converted and the migration process that was stopped is set as unsuccessful. The status of all other bots that were not converted is set as pending.
 - The View historical activity page for the entry shows the reason for the failure.

Verify the bot migration

It is important that you verify that the migration is complete and the migrated bot runs successfully in the A2019 environment. The bot might have been converted, but it might contain errors that prevent it from running successfully.

1. Log in to your A2019 environment from a machine with the Bot agent installed using a Bot Creator account and the "View Migration" permission.
2. Verify that the migration completed successfully by clicking Administration > Migration.
3. Confirm that your migration instance has the "successful" status (indicated by the green check mark) and the Migrated Item column shows "1" to indicate that 1 bot was migrated. If the Migrated Item

column shows "0", your bot has not migrated successfully and will not be available on the My Bots page.

4. Verify that the bot runs successfully by clicking Activity > In progress.
5. Navigate to the migrated bot.
For example, if you migrated a bot from the My Tasks folder, then navigate to the same folder to find your migrated bot.
6. Click the bot and fix any errors.
7. Run the bot to confirm that all errors have been fixed.

Related concepts

[Understanding Enterprise A2019 migration](#) on page 430

The migration feature enables you to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 10.x or 11.x to Enterprise A2019. The migration capability is available in Enterprise A2019 from Build 2079 onwards for On-Premises deployment.

View migration reports

Use the reports to analyze the status of individual bot migration, data migration, and audit log migration and identify the status and summary of the individual migration.

You must have the View migration permission to access these reports.

The migration reports provide summary and status based on following type of migration:

- The bot migration that includes details about the conversion of 10.x or 11.x bots to A2019.
- The data migration that include details about copying 10.x data to A2019.
- The audit migration includes details about migrated 11.x audit log data to A2019.

Access the reports from the Administration > Migrations > View migration icon associated with the migration instance for which you want to view the report.

- Bot migration reports: Applies to both 10.x and 11.x.

View the following information:

- Migration details such as name of the migration instance, its description, and status.
- Migration results such as the start and end time of the migration process, status of the migration, and the number of items migrated.
- General: Whether the option to overwrite files was selected.
- Run-as: Information about the run-as user selected for the migration instance.
- Bot migration results such as all the bots (parent bots and their child bots) that are migrated and their status.

Click the View migration issues icon associated with an unsuccessfully migrated bot to see the unsupported commands or attributes.

- General details about the user who created the migration instance, last modification date, and its object type.
- Bot Insight Migration Results: Applies to 11.x only.

View Bot Insight results if you have migrated 11.x analytics bots. This tab displays information such as the status of the Bot Insight migration, number of Bot Insight dashboards, and data rows that are migrated, not migrated, or skipped.

- Data migration reports: Applies to 10.x only.

View the following information:

- Migration details such as name of the migration instance, its description, and status.
 - Data migration results such as the start and end time of the migration process, status of migration, and number of items migrated.
 - Roles that are copied and their status.
 - Users that are copied and their status.
 - Auto-login credentials that are copied and their status.
 - Bots that are copied and their status.
 - Schedules that are copied and their status. The copied schedules are disabled in Enterprise A2019 because migration of the associated devices is not supported and therefore they are not available.
 - General details about the user who created the migration instance, last modification date, and its object type.
- Audit log migration reports: Applies to 11.x only.

View the following information:

- Migration details such as name of the migration instance, its description, and overall status of migration such as in progress, successful, or unsuccessful.
- Migration results such as the start and end time of the migration process, duration, and number of items skipped, not migrated, or migrated.
- Audit log migration results such as file path of audit log JSON files, status of each `es_export.json` file if it was skipped, not migrated, migrated, or is pending for migration. It also displays the reasons because of which a particular `es_export.json` file was skipped or unsuccessful when migrating audit logs.
- General details about the user who created the migration instance, last modification date, and its object type.

Export to CSV

You can export two sets of data to a CSV file: the migration instances on the All migrations page and bot migration results data, including any action mapping for each bot. Exported data can be used for offline analysis and to identify bots that failed the migration and their associated failed actions.

For migration instance data, the export process exports all data (including hidden data columns), but only for the current page. If you have migration instances on additional pages, you must navigate to those pages to export that data. For migration result data, all pages are exported, even if the data is paginated.

Users with the "View migration" permission can perform the export.

1. Click Administration > Migrations.
2. Export migration instances:
 - a) Use the checkboxes to select the migration instances you want to export.
 - b) Click the Export checked items to CSV icon.
3. Export migration results data:
 - a) Select the migration instance where Type is Bot migration" that you want to export.
Only bot migration results can be exported.
 - b) Click the Export bot migration results option to export the data.
You can also export from inside the Migration report.
4. Open the CSV file to see the exported data.

View changes to migrated bots using Migration Assistant

Use the Migration Assistant to view a list of changes that are made in a 11.x or 10.x bot when it is migrated to the Enterprise A2019. The Migration Assistant enables you to review all the changes made in a bot from the Bot editor.

- 11.x or 10.x bots must be migrated to Enterprise A2019.
- The user reviewing the messages must have the Bot Creator license assigned to them.

Review messages are available for bots that are successfully migrated to Enterprise A2019 but with some changes in the migrated bots. These review messages indicate changes in the behavior of the 11.x or 10.x commands after they are migrated to Enterprise A2019.

You can open the Migration Assistant for a migrated bot that is listed in the Messages tab of the Bot Scanner report. Review the messages about the changes in the commands after migration and mark these messages as reviewed after analyzing the change.

1. Open the migrated bot from Bots > My bots for which you want to review the messages.
2. Click the migration assistant icon on the toolbar to open the Migration Assistant.
3. Click Get started.
4. On the Migration Assistant screen, click the Need review tab to list the messages that require review.
5. Click a message in the Need review tab to view detailed information about the change.
6. Click the Mark as reviewed option to mark the message as reviewed.

The messages that are marked as reviewed are available in the Reviewed tab.



Note: You can mark a message as reviewed only for the migrated bots that are available in your private repository.

Migrate Community Edition bots

Bots created in the 11.x Community Edition environment must be migrated to the A2019 Community Edition to allow users to use these bots in A2019. You use the Bot Migration package available in the A2019 Community Edition to manually migrate the bots.

Before you start migrating bots, do the following:

- Use the Bot Scanner utility to determine if your 11.x bots can be migrated successfully.
- [Bot Scanner overview](#) on page 447
- Get access to A2019 Community Edition.
- Register a device in A2019 Community Edition to run bots.

[Install Bot agent and register device](#) on page 400

This procedure migrates one bot at a time. To migrate all bots within the same folder, you can create a complex bot by iterating files in a folder in a loop or add multiple Migrate bot actions for each `.atmx` file you want to migrate.



Important: If a bot has dependencies on other bots, you must migrate the dependent bots first and then the parent bot. For example, the `main.atmx` parent bot has a dependency on `child1.atmx`, which also has a dependency to `child2.atmx`, then add the Migrate

bot actions in the following order: `child2.atmx`, followed by `{{child1.atmx}}` and then `{{main.atmx}}`.

1. Log in to A2019 Community Edition.
2. Use the Bot Migration package to migrate your bots.
 - a) Navigate to Bots > My bots.
 - b) Click Create New > Bot.
 - c) Expand the Bot Migration package and double-click the Migrate bot action.
 - d) Select Desktop file within the Bot file path section.
 - e) Enter the complete path of the 11.x .atmx file you want to migrate.
 - f) Optional: Enter the output folder path into the Output folder path field to specify where you want package conversion information and errors to be stored.
A report showing relevant information is generated for each migrated bot.
 - g) Leave the Overwrite the file if exists option selected (default setting) if you want this migrated bot to overwrite any bots of the same name in the A2019 Community Edition environment.
 - h) Save the bot.
 - i) Run the bot on the connected device to perform the migration.

Successfully migrated bots are uploaded to the A2019 private repository of the user who performed the migration. Only successfully migrated bots are migrated. Use the reports in the specified Output folder path to see the migration errors.

Related tasks

[Scan bots using Bot Scanner](#) on page 448

The Bot Scanner enables you to analyze the bots (TaskBots and MetaBots) created in Enterprise Control Room 11.x and 10.x and generates reports.

Related reference

[Bot migration package](#) on page 539

The Bot migration package contains the Migrate bot action that enables you to migrate a bot (TaskBots and MetaBots) from 10.x and 11.x to A2019.

Migrate to IQ Bot A2019

Migration is the process of upgrading from earlier versions of IQ Bot (11.x, 6.x, or 5.x) to the latest IQ Bot A2019 version. This includes replicating your existing database and repository, converting your bots to Enterprise A2019 format, and migrating all the learning instances.

Plan your migration

IQ Bot A2019 features and functionality are the same as IQ Bot 11.x. The existing 11.x content also applies to IQ Bot A2019.

- Compare some of the key features of IQ Bot A2019 deployment models with IQ Bot release.

[IQ Bot A2019 feature comparison matrix](#) on page 234

- Review the IQ Bot version compatibility information.

[IQ Bot A2019 version compatibility](#) on page 238

Choose your migration path

Choose your migration path based on the IQ Bot version you are currently using and the IQ Bot A2019 deployment model that meets your business requirements.



Note: In earlier IQ Bot versions, five databases were created, and in IQ Bot A2019 a single unified database is created. So ensure you back up your existing IQ Bot databases before you start the migration.

If you are on this version	Perform this migration procedure
IQ Bot 11.3.4	Migrate to IQ Bot A2019 On-Premises or Cloud: 1. Migrate to the latest IQ Bot A2019 On-Premises version 2. Migrate from IQ Bot A2019 On-Premises to Cloud on page 513 Install the latest version of IQ Bot A2019 On-Premises before you migrate to IQ Bot Cloud.
IQ Bot 6.5.x	You can migrate to IQ Bot A2019 On-Premises only from IQ Bot Version 11.3.4. 1. Update IQ Bot Version 6.5 to IQ Bot Version 11.3.4 Update IQ Bot from 6.5 or earlier to 11.3.4 2. Migrate to the latest IQ Bot A2019 On-Premises version 3. Migrate from IQ Bot A2019 On-Premises to Cloud on page 513 Install the latest version of IQ Bot A2019 On-Premises before you migrate to IQ Bot Cloud.
IQ Bot 5.3.x (or earlier)	1. Update to IQ Bot Version 6.5 Update IQ Bot from 5.3.x or 6.0 to 6.5 2. Update IQ Bot Version 6.5 to Version 11.3.4 Update IQ Bot from 6.5 or earlier to 11.3.4 3. Migrate to the latest IQ Bot A2019 On-Premises version 4. Migrate from IQ Bot A2019 On-Premises to Cloud on page 513 Install the latest version of IQ Bot A2019 On-Premises before you migrate to IQ Bot Cloud.

Related concepts

[Install and update IQ Bot A2019](#) on page 422

This collection of topics guide you through the process of installing or setting up IQ Bot A2019 Community Edition, On-Premises, and Cloud.

Migrate earlier IQ Bot versions to IQ Bot A2019 On-Premises

Migrate from an earlier IQ Bot version (from 6.x through 11.x) to IQ Bot A2019 (On-Premises) for the latest features and enhancements.

1. If you are currently using any of the earlier versions of Automation Anywhere Enterprise (10.x or 11.x), ensure you migrate to the latest Enterprise A2019 version.

[Migrate to Enterprise A2019](#) on page 430

2. Ensure the Enterprise A2019 version corresponds to the IQ Bot A2019 that you are installing.

[IQ Bot A2019 version compatibility](#) on page 238

3. Migrate to the latest IQ Bot A2019 On-Premises from IQ Bot Version 11.3.4 or later versions. If you are currently using any of the earlier IQ Bot versions (5.3.x), you must first perform these tasks:

- a. Update to IQ Bot Version 6.5.

See [Update IQ Bot from 5.3.x or 6.0 to 6.5](#)

- b. Update IQ Bot Version 6.5 to IQ Bot Version 11.3.4 before migrating to IQ Bot A2019 On-Premises.

See [Update IQ Bot from 6.5 or earlier to 11.3.4](#)

4. Back up your existing IQ Bot databases.

In the earlier IQ Bot versions, five databases were created. With IQ Bot A2019 On-Premises Build 2545, a single unified database is created.



Note: After migration to IQ Bot A2019 is complete, output files processed in IQ Bot 11x will not be available for download through the IQ Bot package in the Enterprise Control Room.

Use the A2019 Database Migration Assistant to migrate data from IQ Bot Version 11.3.4 or later databases to the IQ Bot A2019 unified database.

1. Uninstall any earlier IQ Bot versions.



Note: Uninstalling an existing IQ Bot build does not delete the database.

2. Open `Automation_Anywhere_IQ_Bot_A2019_(Build number)` folder and run the following files:

- a) `CleanupRabbitMQandErlang`
- b) `CleanupRabbitMQErlangPython`
- c) `UninstallPython`
- d) `UninstallPython385`

3. Restart your machine.

4. Log in to Automation Anywhere support site and download the Database Migration Assistant:

A-People Downloads page (Login required)

5. Double-click the file to start the installation.

6. Click Next to continue, accept the license agreement, and click Next.

7. In the Database Configuration screen, enter your existing IQ Bot database host name and credentials, and click Next.
8. Optional: Click Browse to change the default installation folder for the Database Migration Assistant.
9. Click Install.
The Database Migration Assistant migrates data from the existing IQ Bot databases to the IQ Bot A2019 unified database, and a new database called IQBot is created.
10. Log in to the Automation Anywhere support site to download and install the latest IQ Bot A2019 build:
A-People Downloads page (Login required)
11. During installation, specify the same host name where the IQBot database was created.
IQ Bot A2019 automatically connects to the IQBot database that was created by the Database Migration Assistant before migrating the data.
12. After installing IQ Bot A2019, unregister IQ Bot 11.x.
13. Clear the browser cache.
14. Optional: Restart the Cognitive Console service if IQ Bot fails to load.
15. Register IQ Bot A2019.x with the Enterprise Control Room.
x refers to the version previous to the upgraded version. For example, if you are installing IQ Bot A2019.16 (Build 6443), ensure you register IQ Bot A2019.15 (Build 5931).

Registering IQ Bot with the Enterprise Control Room

- If the login page is not displayed after registering IQ Bot A2019.x, restart the Enterprise Control Room services (Enterprise Control Room and Enterprise Control Room Reverse proxy).
 - If none of the domains or dashboards are displayed when you log in to IQ Bot A2019 after a successful migration, perform the following steps:
 - Press the F12 key and click the Network tab to view the APIs.
If the APIs are unauthorized or display an error message, restart the IQ Bot service.
 - If the bots are not displayed in the learning instances, clear the browser cache.
16. After the data is migrated, ensure you modify the name of the output `.csv` file.
The output `.csv` file in IQ Bot A2019 contains additional characters. If you are using the `download` command, use the following instructions to edit the output `.csv` filename:
 - Remove the brackets `[]`.
 - Replace the underscore (`_`) character with a hyphen (`-`).
 - Replace spaces with underscore (`_`).

For example, if the output `.csv` filename is `[sales-7d6 961f3d28]_Invoice.tiff`, rename it as `sales-7d6_961f3d28-Invoice.tiff`.

Migrate from IQ Bot A2019 On-Premises to Cloud

IQ Bot Cloud offers all the IQ Bot A2019 On-Premises features through a browser-based interface.

You must install the latest version of IQ Bot A2019 On-Premises before migrating to IQ Bot Cloud. See [Migrate earlier IQ Bot versions to IQ Bot A2019 On-Premises](#) on page 512.

Users have the following options to upload the `.iqba` file to IQ Bot Cloud:

- Migrate learning instances

Click Migration Utility > Export/Import in IQ Bot A2019 On-Premises (starting from Build 5931).

[Migrate learning instances](#) on page 514

- Generate learning instances file

Use Migration Utility to generate the `.iqba` learning instances file, which can then be uploaded to the IQ Bot database using API.

[Migrate Learning Instances in IQ Bot Cloud through API \(A-People login required\)](#)

1. Use the Migration Utility feature to export learning instances from IQ Bot A2019 On-Premises version.
2. Use the IQ Bot UI or API to upload the `.iqba` file to IQ Bot Cloud.
3. Open IQ Bot Cloud and import learning instances using Migration Utility.

All your learning instances from IQ Bot A2019 On-Premises are imported and available on IQ Bot Cloud.



Important: Review the following points:

- If the learning instances are large, migrate them one at a time to avoid timeouts.
- Migrate custom domains if you use them.
- Import the custom domains in the same order as they were in the IQ Bot A2019 On-Premises version.

Migrate learning instances

Use the IQ Bot A2019 Migration Utility feature to migrate (export and import) learning instances between environments to avoid recreating similar learning instances and easily manage the lifecycle of a learning instance and associated bots.

The migration operation requires the IQ Bot Admin role or a custom role with migration permissions.

When you export an `.iqba` file, only a single document associated with every available bot (Group) training is exported.

To migrate learning instances from one environment to another, follow these steps:

1. Log in to IQ Bot as an administrator.
2. Create a backup of the learning instances in the source environment:
 - a) Click Administration > Migration.
 - b) Click Create Backup.
 - c) Select the learning instances you want to back up and then click Backup.
 - d) Enter an appropriate name for the IQ Bot archive (IQBA) file and click Backup to begin the export process.

The name of the backup file is appended with a time stamp to make it unique. You can download this file and export it to the target environment.

The exported data file with the `.iqba` extension is available in the BackupData folder in your IQ Bot output directory.

Example: `C:\Users\Public\Documents\Automation Anywhere IQBot Platform\Output\BackupData`

3. Download the `.iqba` file to move it to the destination environment. Click the download icon next to the backup entry in the list.
4. Upload the `.iqba` file to the destination environment:

- a) Click Administration > Migration.
- b) Click Upload.
- c) Select the .iqba file you want to upload from your file system and click Open.



Tip: After your file is uploaded, click Refresh to manually refresh the page and use the uploaded file from the list.

5. Click the restore icon next to the backup entry in the list to restore the uploaded backup file in the destination environment.

Migration Utility enhancements

Starting from the IQ Bot A2019.14 release, enhancements for importing learning instances (that were created using a custom domain) to the production server are available.

Migrating learning instances (that were created using a custom domain) from one system to another does not automatically import the associated domain to the target system. Therefore, when you run the imported learning instances on the production documents, the documents do not get classified because the associated field names and IDs for the custom domain do not work in the imported learning instance.

Migrating single or multiple learning instances

Prerequisite: The same version of the custom domain must exist in the staging (source) and production (target) servers.

IQ Bot includes some checks for importing a learning instance to the production environment to ensure the custom domain associated with a learning instance is migrated to the production server first, so the learning instances do not fail after migration.

- You can import the same learning instance to the production server multiple times.
However if you import a learning instance with an edited or updated domain and if the updated domain does not exist in the production server, the system will not allow you to import the learning instance.
- In this scenario, if the Import option is used (IQ Bot > Migration tab) to import the learning instance, a system-generated error message is displayed stating that the learning instance version is incompatible, and the import process is canceled.
- IQ Bot checks for the following when importing a learning instance to the production server:
 - Does the domain exist in the production server?
 - Do the same fields exist in the production server?
 - Do the same field aliases (available variations for a specific field in the documents) exist in the production server?
- Learning instance import fails if the system detects an issue with any of the checks.
- An import is successful when the user has maintained the same version of the custom domains, associated with the learning instance, in the staging and production servers.

If the learning instance import fails, the user can find the reason for the migration failure in the following locations:

- In the IQ Bot `Project service log` files, which will show an inconsistency in any of the following parameters:
 - domain name

- field names
 - project or learning instance name
 - field alias names
- In the Control Room > Audit logs

[Custom Domain in IQ Bot](#)

Build

This collection of topics will get you started automating tasks and processes as quickly as possible.

Related reference

[Actions palette content for bot creation](#) on page 518

Use actions to build an automation workflow and to instruct a bot what to do. In Enterprise A2019, the available actions are located in the Actions palette in the Bot editor.

[Variables overview](#) on page 866

Enterprise A2019 offers a variety of variables, each designed to hold specific types of data and is intended for specific use. Use the topics below to learn more about each variable and how to use them.

Related information

[Training - Hello A2019 Bot: Getting Started with Building Bots](#)

Bot editor for creating bots

The Bot editor enables users to create and edit bots from any device, and from anywhere the user can access a web browser.

Overview

Because Enterprise A2019 is web-based, there is no separate client to download. Access the Bot editor by logging in to Enterprise A2019, navigating to BOTS > My bots, and then opening an existing bot or by creating a new one.

The Bot editor is a web-based environment and includes the following features:

- Universal Recorder to simplify capturing processes
- Three view options for bot creation:
 - Flow: Graphical representation of the process (default).
 - List: Sequential entries for each action.



Note: Drag the selected action within the task logic.

- Dual: Split screen of the Flow and List views.
- Powerful bot code management
- Python and JavaScript actions support inline scripting without linking, with drag-and-drop integration
- Rich variable passing, with no cross-language mapping required

Accessing the Bot editor

To access the Bot editor, you must start creating or modifying a bot.

Go to My Bots in the Enterprise Control Room

- To create a bot, click the Create TaskBot icon on the top-right of the page.
- To modify a bot, click the bot from the list.

Watch the following video on how to get started with the Bot editor:

More resources

- Free Enterprise A2019 bots and command packages from Bot Store: [Prebuilt automation for Enterprise A2019](#)
- [Create your first bots](#)

Related tasks

[Run a bot](#) on page 856

You can test an automated process by running a bot.

Related reference

[Editing bots](#) on page 860

Edit bot logic using the Bot editor to add, modify, or delete actions and automation steps.

Actions palette content for bot creation

Use actions to build an automation workflow and to instruct a bot what to do. In Enterprise A2019, the available actions are located in the Actions palette in the Bot editor.

Actions, packages, and dependencies

Actions are grouped into packages. For example, the Excel advanced package contains Excel-related actions, such as Open workbook, Go to cell, and Delete cell, that you can insert in to the Bot editor to automate a spreadsheet process.

Learn more about managing packages in [Managing packages](#) on page 1096. Developers can learn more about creating packages in [Package Software Development Kit \(SDK\)](#) on page 989.

After an action from a package is used in a bot, that package becomes a dependent file of that bot. Learn more about managing bots and package dependencies in [Bot dependencies](#) on page 884.

Working with actions

Actions in the Bot editor are configurable. Double-click the action to see the fields and features that you can configure. Double-click or drag an action to insert it into the automation workflow.

Mouse over the vertical ellipsis at the top right of an action icon to access the following features:

Copy action

Duplicate the action.

Cut action

Copy the action and remove it from the bot code.

Paste after action

Paste the copied action below the selected action.



Note: This option only appears when there is an action in the clipboard.

Delete action

Remove the action from the bot code.

Disable action

At run time, bot ignores the action until you enable it.

Enable breakpoint

Pauses the bot for debugging purposes.

[Debugger features](#) on page 1053

You can edit multiple actions at a time, using the toolbar at the top of the Bot editor.

Copy items

Copy actions to a clipboard so they can be duplicated within the bot.

Cut items

Copy the actions and remove them from the bot code.

Paste items

Paste one or more actions after the highlighted action. If you have not highlighted an action, the actions are appended to the end of the automation sequence.



Note: This icon is only enabled when there are actions in the clipboard.

Copy to shared clipboard

Copy actions, triggers, and metadata to a clipboard that is shared between bots.

Paste from shared clipboard

Paste actions, triggers, and metadata from another bot.



Note: This icon is only enabled when there are actions in the shared clipboard.

Resources

To learn more, see [Training - Install and upgrade actions without reinstallation](#). This course introduces you to packages, benefits, and installation.



Note: You must log in with a registered A-People Community [account](#) to access course.

Watch the following video on how to use actions in Enterprise A2019:

Related reference

[Bot editor for creating bots](#) on page 517

The Bot editor enables users to create and edit bots from any device, and from anywhere the user can access a web browser.

AARI web package

The AARI web package contains actions that enable Enterprise Control Room users to configure their bots to work on requests, tasks, and team members.

Before you start

Ensure you have met one of the following conditions in order to run this package:

Condition 1

- Access to a process in an assigned team.
- Access to an AARI User license.
- A system-created AAE_Robotic_Interface User role for the AARI user.

Condition 2

- Access to a Bot Runner license (Attended or Unattended) or Bot Creator license.
- A user-created role with the View My Bots and Run My Bots permissions.

Actions in the AARI web package

The AARI web package includes the following actions:

Action	Description
Assign Task	Assigns options to a task. • In the Task ID to be assigned field, specify a value. • In the User ID to assign to task field, specify a value. • Optional: In the Assign the result to variable field, assign a variable to store as an output. The output is stored as a string value.
Cancel Task	Cancels a task. • In the Task ID to cancel field, specify a value. • Optional: In the Assign the result to variable field, assign a variable to store as an output. The output is stored as a string value.
Create a Request	Creates a request. • In the Select Process field, select or upload your process. • Specify your variable in the Dictionary or Variable field. • Dictionary: Enter the variable information in the Type, Key, and Value fields. In the Type field, choose from Any, String, Number, Datetime, or Boolean. • Optional: In the Add field, add more dictionary variables. • Variable: Enter your custom variable. • Optional: In the Assign the Request ID to field, assign a variable to store as an output. The output is stored as an ID value.

Action	Description
Query Requests	Enables the user to query requests with custom filters. - Select a filter.  Note: The filters for process and request titles, tags, IDs, and PII tags have the same list of options. - Specify the string value in the List or Variable field. - Specify your type in the List or Variable field. - List: Input your value information in the Type and Value at 0 fields. - Optional: In the Add field, add more values. - Variable: Enter your custom variable. - In the Request Status field, select a status. You can choose OPENED, SUCCESS, ERROR, and CANCELLED - In the Page field, specify a value. - In the Table start at offset of data field, enter a value. - In the Number of rows per page field, enter a value. The default value is set 200 for number of rows. - In the Sort field, specify the option. - In the Direction field, select Descending or Ascending. The default value is set to Descending for the direction. - In the Select sort column field, select an option. You can choose between process title or the request creation, ID, title, status, or PII tag. - Select the Enable 2nd degree sort and specify the Direction and Select sort column fields. - In the Assign the result to variable field, assign a variable to store as an output. The output is stored as a table value.

Action	Description
Query Tasks	Enables a user to query tasks with custom filters. - Select a filter.  Note: The filter for process and request titles, tags, IDs, status, and PII tags provide the same list of options. - Specify the string value in the List or Variable field. - Specify your type in the List or Variable field. - List: Input the value information in the Type and Value at 0 fields. - Optional: In the Add field, add more values. - Variable: Enter your custom variable. - In the Request Status field, select a status. You can choose OPENED, SUCCESS, ERROR, and CANCELLED - In the Task State field, select a status. You can choose IN_PROGRESS and COMPLETED. - In the Page field, specify a value. - In the Table start at offset of data field, enter a value. - In the Number of rows per page field, update the value. The default value is set to 200 for number of rows. - In the Sort field, specify the following options. - In the Direction field, select Descending or Ascending. The default is Descending for the direction. - In the Select sort column field, select an option. You can choose from the request and tasks IDs, titles, creation, status, or PII tags. - Select the Enable 2nd degree sort and specify the Direction and Select sort column fields. - In the Assign the result to variable field, assign a variable to store as an output. The output is stored as a table value.
Team Members	Retrieves the list of members of a team. - In the Supply team ID to query it's members field, specify a value. - In the Assign the result to variable field, assign a variable to store as an output. The output is stored as a table value.

Active Directory package

Use the Active Directory package to automate actions in the Active Directory. An Active Directory is a directory service provided by Microsoft to assist the admin in managing users across a group or organization.

Automation Anywhere Enterprise uses Lightweight Directory Access Protocol (LDAP) to read from and edit users in the Active Directory. The server and domain names are combined to create an LDAP path, which is used to connect to the Active Directory.

Before you start

Perform the following actions within the Active Directory package as part of using the set of available actions:

1. Establish a connection with the Active Directory using the Connect action. Use this same session name for the other actions. [Using the Connect action](#) on page 527
2. Use the actions to automate a task.
3. After you have automated all the Active Directory-related tasks, terminate the connection to the server using the Disconnect action.

Operations in the Active Directory package

The Active Directory package includes the following operations:

Operation	Description
Computer operations	See Computer operations on page 523.
Group operations	See Group operations on page 525.
LDAP operations	See LDAP operations on page 526.
Organizational unit operations	See Organizational unit operations on page 527.
User account operations	See User account operations on page 529.

Computer operations

The computer operations in the Active Directory package contain various actions to automate tasks related to computers, including create, delete, get property, rename, and set property.

Actions in the Active Directory package

The Active Directory package includes the following actions for computer operations:

Action	Description
Create computer	Creates a new object for the computer. • Enter the same session name as the one you used in the Connect action. • Enter a name for the computer. • Optional: Enter a description of the computer.
Delete computer	Deletes an existing computer. • .Enter the same session name as the one you used in the Connect action. • Enter a name for the computer.
Get computer property	Retrieves a specific property value for a computer. • Enter the same session name as the one you used in the Connect action. • Enter the computer name. • Enter the property. • Assign the value to a string variable.
Move computer	Using the Move computer action on page 524
Rename computer	Renames an existing computer. • Enter the same session name as the one you used in the Connect action. • Enter a name for the computer. • Enter a new name for the computer.
Set computer property	Assigns a value to a computer property. • Enter the same session name as the one you used in the Connect action. • Enter the computer name. • Enter the property to update. • Enter the new value.

Using the Move computer action

Use the Move computer action to move the computer from an existing location to a new location.

Ensure there is an existing computer.

[Computer operations](#) on page 523

1. In the Actions palette, double-click or drag the Move computer action from the Active Directory package.
2. Add the computer name:
 - Select the name from the server:
 - a. Click Add computer from server.
 - b. Enter the host and domain credentials in the Connect to server window and click Connect.

- c. In the Select computer window, select the computer name from the Domain Objects panel and click Apply.
- Enter the name in the Computer name field.
3. Add the LDAP path: or perform the following steps if you choose the option :
 - Enter the path in the Move to field.
 - Click Select computer object and perform these steps:
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select computer window, select the destination server path from the Domain Objects panel and click Apply.
4. Enter the same session name in the Active Directory session that you used in the Connect action.
5. Click Save and Apply.

Group operations

The group operations in the Active Directory package contain various actions to automate tasks related to groups, including create, delete, get property, and set property.

Actions in the Active Directory package

The Active Directory package includes the following actions for group operations:

Action	Description
Create group	Creates a new group. • Enter the same session name as the one you used in the Connect action. • Enter a unique name for the group. • Optional: Enter a description for the group. • Select the group scope from the following options: • Domain Local • Global • Universal Group scope • Select the group type from the following options: • Security: Provides users with access rights to folders. • Distribution: Sends emails to a group of users.
Delete group	Deletes an existing group. • Enter the same session name as the one you used in the Connect action. • Enter the name of the group to delete.

Action	Description
Get group property	Retrieves a specific property value for the group. - Enter the same session name as the one you used in the Connect action. - Enter the group name. - Enter the property. - Assign the value to a string variable.
Rename group	Renames an existing group. - Enter the same session name as the one you used in the Connect action. - Enter the group name. - Enter a new name for the group.
Set group property	Assigns a value to a group property. - Enter the same session name as the one you used in the Connect action. - Enter the group name. - Enter the property to update. - Enter the new value.

LDAP operations

The Lightweight Directory Access Protocol (LDAP) operations in the Active Directory package contain various actions to automate tasks related to LDAP, including connect, disconnect, and run query.

Actions in the Active Directory package

The Active Directory package includes the following actions for LDAP operations:

Action	Description
Connect	Using the Connect action on page 527
Disconnect	Closes the connection with the LDAP server.
Run query	Runs a specified Active Directory query. The query results are stored in a list variable, either for object names or LDAP paths, depending on the option selected. You must: - Enter the same session name as the one you used in the Connect action. - Input the query. For example: (&(objectCategory=person)(objectClass=user)(name=A*)) - Specify the return type. Select either the Object Name or LDAP Path option. - Assign the value to a string variable.

Using the Connect action

Use the Connect action to establish a connection with an Active Directory server. This is the first action you must use to automate an Active Directory related task.

This action enables you to provide the server credentials and details, and associate this information with a session name. Use this same session name for the other Active Directory actions so that you have to provide the server information only once.

To establish a connection with an Active Directory server, follow these steps:

1. In the Actions palette, double-click or drag the Connect action from the Active Directory package.
2. Enter a session name.
3. Enter or create the LDAP URL:
 - Parent path: Enter the LDAP URL that identifies the server that hosts the Active Directory services.
For example, `LDAP://192.168.2.60/DC=corporate,DC=com`
 - Build parent path: Create the LDAP URL:
 - a. Click the Build parent path option to connect to the Active Directory server.
 - b. In the Connect to server window, enter the host and domain credentials, and click Connect.
 - c. In the Object Explorer window, select the specific path from the Objects panel.
 - d. Verify the selected LDAP URL path in the Preview field and click Apply.
4. In the Login user field, provide your username with one of the following options:
 - Credential: Select a credential from the Credential Vault. [Credentials and credential variables in the Bot editor](#) on page 878
 - Variable: Select a variable holding a credential data type value. [User-defined variables](#) on page 869
 - Insecure string: Enter a value or select a variable.



Attention: Values entered using this option are not encrypted.

5. In the Login password field, provide your password with one of the following options:
 - Credential: Select a credential from the Credential Vault. [Credentials and credential variables in the Bot editor](#) on page 878
 - Variable: Select a variable holding a credential data type value. [User-defined variables](#) on page 869
 - Insecure string: Enter a value or select a variable.



Attention: Values entered using this option are not encrypted.

6. Click Save.

Organizational unit operations

The organizational unit operations in the Active Directory package contain various actions to automate tasks related to organizational units, including create, delete, and rename organizational units, and get and set property.

Actions in the Active Directory package

The Active Directory package includes the following actions for organizational unit operations:

Action	Description
Create organizational unit	Creates a new object for the organizational unit. - Enter the same session name as the one you used in the Connect action. - Enter a name for the organizational unit. - Optional: Enter a description of the organizational unit.
Delete organizational unit	Deletes an existing organizational unit. - Enter the same session name as the one you used in the Connect action. - Enter the name of the organizational unit to delete.
Get organizational unit property	Retrieves a specific property value for an organization and assigns the results to a variable. - Enter the same session name as the one you used in the Connect action. - Enter the organizational unit name. - Enter the property. - Assign the retrieved value to a string variable.
Move organizational unit	Using the Move organizational unit action on page 528
Rename organizational unit	Renames an existing organizational unit. - Enter the same session name as the one you used in the Connect action. - Enter the name of the organizational unit to rename. - Enter the new name.
Set organizational unit property	Assigns a value to an organizational property. - Enter the same session name as the one you used in the Connect action. - Enter the organizational unit name. - Enter the property to update. - Enter the new value.

Using the Move organizational unit action

Use the Move organizational unit action to move an organizational unit from an existing location to a new location.

Ensure there is an existing organizational unit.

[Organizational unit operations](#) on page 527

1. In the Actions palette, double-click or drag the Move organizational unit action from the Active Directory package.
2. Add the organizational unit name:
 - Add the name from the server by performing these steps:

- a. Click Add organizational units from server.
 - b. Enter the host and domain credentials in the Connect to server window and click Connect.
 - c. In the Select organizational unit window, select the organizational unit name from the Domain Objects panel and click Apply.
- Enter the name in the Organizational unit name field.
3. Add the LDAP path: or perform the following steps if you choose the option Select organizational unit object
 - Enter the path in the Move to field.
 - Select organizational unit object and perform these steps:
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select organizational unit window, select the destination server path from the Domain Objects panel and click Apply.
4. Enter the same session name in the Active Directory session that you used in the Connect action.
5. Click Save and Apply.

User account operations

The Active Directory package contains various actions to automate tasks related to user account management, including create, delete, get property, remove, rename, and set property.

Actions in the Active Directory package

The Active Directory package includes the following actions for user account operations:

Action	Description
Add users to group	Using the Add users to group action on page 531.
Create user	See Using the Create user action on page 530.
Delete user	Deletes the user. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name.
Disable user account	Disables a user account. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name.
Enable user account	Enables a user account. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name.

Action	Description
Get all users of a group	Retrieves a list of all the users of a group, and assigns the results to a variable. • Enter the same session name as the one you used in the Connect action. • Enter the group name. • Specify the return type. Select either the Object Name or LDAP Path option. • Assign the value to a string variable.
Get user property	Retrieves a specific property value for a user and assigns the results to a variable. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name. • Enter the property. • Assign value to a string variable.
Remove users from group	Using the Remove users from group action on page 531.
Rename user	Renames the user logon name or the user account name. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name. • Enter the name to search for. • In the New name field, enter the updated name. • Select from the following options to specify what to update: • Rename user name • Rename logon name • Rename user and logon name
Set user property	Enables you to assign a value to a user property, view the current details, and update it. • Enter the same session name as the one you used in the Connect action. • Select whether to search for the user by User name or Logon name. • Enter the property to update. • Enter the new value.
Update user details	See Using the Update user details action on page 532

Using the Create user action

Use the Create user action to configure and activate a new user.

Connect to the Active Directory server.

Using the Connect action on page 527

1. In the Actions palette, double-click or drag the Create user action from the Active Directory package.
2. In the Session name field, enter the session name that you provided in the Connect action.
3. Enter a user name.
For example, John Smith.
4. Enter the logon name.
The user will use this value to log in to the account.
For example, john.smith.
5. Enter the user's first name.
6. Optional: Enter these user details: last name, display name, initials, email address, description, department, and title.
7. Select Active user to activate the user.
8. Click Save.

Using the Add users to group action

Use the Add user to group action to add an existing user to a user-created group.

Ensure there is an existing user and group.

User account operations on page 529 | Group operations on page 525

1. In the Actions palette, double-click or drag the Add users to group action from the Active Directory package.
2. From the Select user field, select one of the following options:
 - Add user manually: Enter the Name and Ldap path of the user in the Add user window and click Add.
 - Add users from server: Add an existing user from the server:
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select user window, select the user from the Objects panel and click Add user.

The user name and LDAP path of the user is added in the Select user table.

3. Add the user to the specified group by choosing one of the following options:
 - Group name: Enter the group name to add the existing user to a specific group.
 - Select user group: Add an existing user to a group:
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select user window, select the group from the Objects panel to add user to the destination group and click Apply.
4. Enter the same session name in the Active Directory session that you used in the Connect action.
5. Click Save and Apply.

Using the Remove users from group action

Use the Remove users from group action to remove a user from a group.

Ensure there is an existing user assigned to a group.

Using the Add users to group action on page 531

1. In the Actions palette, double-click or drag the Remove users from group action from the Active Directory package.

2. From the Select user field, select one of the following options:
 - Add user manually: Enter the Name and Ldap path of the user in the Add user window and click Add.
 - Add users from server: Add an existing user from the server:
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select user window, select the user from the Objects panel and click Add user.

The user name and LDAP path of the user is added in the Select user table.

3. To remove the user from a group, select one of the following options:
 - Group name: Enter the group name to remove the existing user from a group.
 - Select user group: Remove an existing user from a group.
 - a. Enter the host and domain credentials in the Connect to server window and click Connect.
 - b. In the Select user window, select the group from the Objects panel to remove user from the group and click Apply.
4. Enter the same session name in the Active Directory session as you used in the Connect action.
5. Click Save and Apply

Using the Update user details action
Use this action to update the details of a user.

Connect to the Active Directory server.

[Using the Connect action](#) on page 527

1. In the Actions palette, double-click or drag the Update user details action from the Active Directory package.
2. In the Session name field, enter the session name that you provided in the Connect action.
3. Select whether to search for the user by User name or Logon name.
4. Enter the user's first name.
5. Optional: Enter the following user details: last name, display name, initials, email address, description, department, and title.
6. Click Save.

Analyze package

Use the actions in the Analyze package to specify the actions and variables to use in the Bot Insight dashboard and widgets. The Analyze package enables you to perform transactional analytics for the data that is logged by the variables when the bot runs.

Actions in the Analyze package

The Analyze package includes the following actions:

Action	Description
Close	Closes the transaction. - In the Transaction name field, enter the transaction name that you provided in the Open action. - In the Dictionary variable, select the following options: - All user-defined variables: Include all the string, numeric, and date time user-defined variables from the bot to populate the Bot Insight dashboards. - Manually select which variables to include in the Bot Insight dashboards.
Open	Opens the transaction. Insert the actions that you want to include for analysis between the Open and Close actions. In the Transaction name field, enter the transaction name.



Note: For an example of building a bot to retrieve data from a website to create visualizations in Bot Insight, [Build a Bot Insight dashboard bot](#) on page 904.

App Integration package

Use the actions in the App Integration package to extract text from a window and save it to a string variable.

The App Integration package supports the following technologies:

- UNIX shells, such as Cygwin, PowerShell, and GIT shell
- Windows applications, such as Calculator, Command Prompt, and Notepad

The actions in the App Integration package are based on legacy technology and have certain limitations on specific applications. To seamlessly obtain data from applications and browsers, use the [Recorder package](#) on page 749.

Building bots with actions from the App Integration package

1. Open the application or file from which you want to capture the text using the Application > Open program/file action.

[Application package](#) on page 536

2. Extract the text using one of the actions from the App Integration package.
3. Use any of the following actions from the String package to manipulate the captured text:
 - Extract text: Extracts text from the source string using logical operators.
 - Split: Splits the string into multiple strings and stores the output in a list variable.
 - Trim: Trims blanks and white spaces from a string.

[String package](#) on page 794

Actions in the App Integration package

The App Integration package includes the following actions:

Action	Description
Capture area	Extracts text from within the captured area of a window and saves it to a string variable. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - Insert a wildcard character (*) in the Window title field to search for window titles that can change. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*)-Notepad</code> for all the window title names starting with <code>(\w*)-Notepad</code>, or use Pattern such as <code>(\w)\s)*document-Notepad</code> for only those window titles that match this pattern. - Optional: Select the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object. - Click Capture region and select the area to capture. - In the Save captured text to a variable field, select a string variable.

Action	Description
Capture scrollable text	Captures scrollable text from the specified window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - Insert a wildcard character (*) in the Window title field to search for window titles that can change. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as (\w*) -Notepad for all the window title names starting with (\w*) -Notepad, or use Pattern such as (\w) \s) *document -Notepad for only those window titles that match this pattern. - Optional: Select the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object. - Click Capture coordinate to capture the coordinates of the window or a specific control within the window. - In the Save captured text to a variable field, select a string variable.
Capture text of window	Extracts all the text from a window and saves it to a string variable. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - Optional: Select the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object. - In the Save captured text to a variable field, select a string variable.

Application package

Use the Open Program/File action in the Application package to launch an application or a file. This action supports .exe, .bat, script files, or shortcut paths.

Actions in the Application package

The Application package includes the following action:

Action	Description
Open program/file	Opens an application or file. - Enter the name of the application or file, or insert a variable. For example, <code>chrome.exe</code>.  Note: You can also enter the full file path in this field. - Optional: Enter the location of the file that you want to use to open the application in the Start in path field. For example, <code>C:\Program Files (x86)\Google\Chrome\Application\</code> - Optional: In the Parameters field, specify the parameters or arguments you want to pass to the program. For example, if you are using the command line, enter the arguments in this field.

AWS Comprehend NLP package

The AWS Comprehend NLP package contains actions that enable you to connect to and consume the Amazon Comprehend API to identify the language, sentiment, key phrases, and entities.

Before you start

You require the following information for an existing AWS account to use these actions:

- Access key and Secret key: Credentials that authenticate Automation Anywhere Enterprise with your AWS account.

See [Access Keys \(Access Key ID and Secret Access Key\)](#).

- Region: Specifies the AWS service endpoint.

See [AWS Service Endpoints](#).

Actions in the AWS Comprehend NLP package

Action	Description
Detect language	Identifies the language of the provided content and returns it in ISO 639-1 language code. The output is stored in a string variable. This action supports over 100 languages. For the full list, see Detect the Dominant Language .
Get key phrases	Identifies the main points and returns a list of key phrases. For example, if the input text is about a basketball game, this action returns the names of teams, the name of the venue, and the final score.
Get named entities	Identifies the entities in the provided content such as people, places, organizations, date/time, quantities, branded products, and book titles. The output is stored in a dictionary variable, where each name is a key, and the corresponding entity is the value.
Get sentiment	Analyzes the provided content and returns the overall sentiment and scores for all possible sentiments. An example output of the dictionary values: <code>POSITIVE {Positive: 0.66238534, Negative: 0.0013064129, Neutral: 0.33621928, Mixed: 8.892125E-5}</code> The output is stored in a dictionary variable containing two keys and their corresponding values: <code>sentiment</code> and <code>score</code> .

Boolean package

The Boolean package contains actions that enable you to do various operations on Boolean values.

Actions in the Boolean package

The actions in the Boolean package accept a variable as an input and assign the output to a variable. These actions enable you to compare two Boolean values, convert a Boolean value to a string or numeric value, and convert a string value to a Boolean value.

The Boolean package includes the following actions:

Action	Description
Assign	Assigns a constant value (True or False) or a user-defined value to a Boolean value. - Select the source Boolean variable or value. - Select the variable to use to store the output from the Destination Boolean variable list. The output is stored in a Boolean variable.

Action	Description
Compare to	Compares two Boolean values and assigns the output to a numeric variable. - Select the Boolean variables to compare from the Select the first Boolean variable and Select the second Boolean variable lists. - Select the variable to use to store the output from the Assign the output to number variable list. The output is stored in a number variable.
Equal to	Verifies whether the two Boolean values are equal or not, and assigns the output to a Boolean variable. - Select the variables that contain the Boolean values to verify from the Select the first Boolean variable and Select the second Boolean variable lists. - Select the variable to use to store the output from the Assign the output to number variable list. The output is stored in a number variable.
Invert	Converts a Boolean value to the opposite value (True to False and False to True), and assigns the output to a variable. - Select the Boolean value to convert. Choose from False, True, or a Variable. - Select the numeric variable to use to store the converted value from the Assign the output to variable list.
To number	Converts a Boolean value to a numeric value. This action converts True to 1 and False to 0. - Select the Boolean variable to convert from the Select Boolean variable list. - Select the numeric variable to use to store the converted value from the Assign the output to variable list.
To string	Converts a Boolean value to a string value. - Select the Boolean variable to convert from the Select Boolean variable list. - Select the string variable to use to store the converted value from the Select the string variable to store the result list.

Compare results for the Compare to action

The following table illustrates how two Boolean values are compared using the Compare to action and their output:

Boolean value 1	Boolean value 2	Compare result
True	True	0
True	False	1

False	True	-1
False	False	0

Compare results for the Equal to action

The following table illustrates how two Boolean values are compared using the Equal to action and their output:

Boolean value 1	Boolean value 2	Equal result
True	True	True
True	False	False
False	True	False
False	False	True

Bot migration package

The Bot migration package contains the Migrate bot action that enables you to migrate a bot (TaskBots and MetaBots) from 10.x and 11.x to A2019.

[Supported versions for migration](#) on page 432

Action in the Bot migration package

The Bot migration package includes the following action:

Action	Description
Migrate bot	Migrates the version 10.x and 11.x bot file to A2019 format and uploads the migrated file to the specified location in your private repository with the same name as .atmx and .mbot file. This action only migrates the bot you specify, but does not migrate its dependencies. Dependencies are the bots and other files that are required to run the bot. You need to migrate the dependent bots separately and upload other files manually to Enterprise Control Room.  Important: We recommend you to use the Enterprise A2019 Bot Migration Wizard to migrate 11.x or 10.x bots to Enterprise A2019. The Bot migration package does not migrate the credential variables and AAAApplicationPath system variable. All the bots migrated using the Bot migration package are stored in the Bots folder in A2019. If you have migrate a parent bot and its child bots separately using the Bot migration package, you must create the same folder structure as in 11.x or 10.x and move the dependent bots to these folders for the parent bot to run successfully. • Use the Control Room file, Desktop file, or Variable tab to specify the location of the bot you want to migrate. • In the Output folder path field, specify the location where you want to save the log files generated for the bot migration.  Note: Ensure that the location you have specified exists on the device. The system does not upload the bot if it fails during the migration process. The system creates an XML report at the same location that provides information that helps you to troubleshoot if the system encounters an error during migrating the bot file. • Select the Overwrite the file if exists check box to overwrite an existing bot file. • Set a time-out value for migrating the bots within the range of 3 through 90 minutes (default value is 90 minutes). If the migration of any specific bot is not completed within the set time, the bot will display a timeout message with the reason for the failure and the migration process will move on to the next bot.

Browser package

The Browser package contains actions that enable you to download files, find broken links, and launch a website. This package supports Internet Explorer, Microsoft Edge, and Google Chrome browsers.

Actions in the Browser package

The Browser package includes the following actions:

Action	Description
Close	Closes a browser window or tab.  Note: This action is only available for the Google Chrome browser. - Select to close the tab, window, or all browsers: - Tab: Closes the selected tab. Select the tab from the list of active tabs in the Google Chrome browser or insert a window variable. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>((\w*) -Notepad</code> for all the window title names starting with <code>((\w*) -Notepad</code>, or use Pattern such as <code>((\w) \s) *document-Notepad</code> for only those window titles that match this pattern. - Window: Closes the window of the selected tab. Select the window from the list of active windows in the Google Chrome browser or insert a window variable. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>((\w*) -Notepad</code> for all the window title names starting with <code>((\w*) -Notepad</code>, or use Pattern such as <code>((\w) \s) *document-Notepad</code> for only those window titles that match this pattern. - All browsers: Closes all open browsers except the windows that contain Enterprise Control Room instances. - Optional: In the Time out after field, enter the number of seconds the bot must wait for the browser window or tab to close before the bot fails.  Recommended: Enter a timeout value of at least 9 seconds.
Download files	Downloads and saves files from URLs. - Specify the URL of the file you want to download. - In the Save to location field, enter the location where you want to save the file.
Find broken links	See Using Find broken links action on page 545.

Action	Description
Get source code	Retrieves the source code of a web page and saves it to a string variable.  Note: This action is only available for the Google Chrome browser. • Select the browser tab from the list of active tabs in the Google Chrome browser or insert a window variable. • Optional: In the Time out after field, enter the number of seconds the bot must wait for the browser window or tab to close before the bot fails.  Recommended: Enter a timeout value of at least 9 seconds. • Optional: Select a variable to hold the action output.
Go back	Returns to a web page that you previously visited in the current tab. This action simulates clicking the browser Back option.  Note: This action is only available for the Google Chrome browser. • Select the tab from the list of active tabs in the Google Chrome browser or insert a window variable. • In the Number of steps field, enter the number of pages to go back. • Optional: Select the Throw an error if steps exceed history option to make the bot fail if the number entered in the previous step is greater than the number of pages visited. If you leave this option deselected, when the bot runs, it will return the tab to the first web page it opened. • Optional: In the Time out after field, enter the number of seconds the bot must wait for the browser window or tab to close before the bot fails.  Recommended: Enter a timeout value of at least 9 seconds.

Action	Description
Launch website	Launches the browser. • In the URL field, specify the website you want to open. • Select your browser from the following: • Default Browser • Internet Explorer • Microsoft Edge • Google Chrome Ensure that Internet Explorer, Microsoft Edge, or Google Chrome is set as the default browser.  Note: If any browser that is not listed is set as the default browser for the device, the bot might encounter an error. When actions such as OCR and Image Recognition are used, the browser must finish rendering before the Microsoft Edge execute.

Action	Description
Open	Opens the browser to a specific web page. - Select to open the web page in an existing tab, new tab, or new window: - Existing tab: Opens the web page in a currently open tab. Select the tab from the list of active tabs in the Google Chrome browser or insert a window variable.  Note: This option is only available for the Google Chrome browser. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>((\w*) -Notepad</code> for all the window title names starting with <code>((\w*) -Notepad</code>, or use Pattern such as <code>((\w) \s) *document-Notepad</code> for only those window titles that match this pattern. - New tab: Opens the web page in a new tab. Select the tab from the list of active tabs in the Google Chrome browser or insert a window variable.  Note: This option is only available for the Google Chrome browser. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>((\w*) -Notepad</code> for all the window title names starting with <code>((\w*) -Notepad</code>, or use Pattern such as <code>((\w) \s) *document-Notepad</code> for only those window titles that match this pattern. - New window: Opens the web page in a new window of a specific browser. Select the browser from the following options: - Default Browser Ensure that Internet Explorer, Microsoft Edge, or Google Chrome is set as the default browser.  Note: If any browser that is not listed is set as the default browser for the device, the bot might encounter an error. - Google Chrome - Internet Explorer - Microsoft Edge - Mozilla Firefox - Enter the link to the web page to open.

Action	Description
Run JavaScript	Executes JavaScript in a web page.  Note: This action is only available for the Google Chrome browser. - Select the browser tab from the list of active tabs in the Google Chrome browser or insert a window variable. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*) -Notepad</code> for all the window title names starting with <code>(\w*) -Notepad</code>, or use Pattern such as <code>(\w)\s*\document-Notepad</code> for only those window titles that match this pattern. - Choose one of the following options: - In the Import existing file option, select an existing JavaScript file.  Note: If you are uploading a script from a file on your desktop, the file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded. - In the Manual input option, enter the JavaScript. - Optional: In the Time out after field, enter the number of seconds the bot must wait for the browser window or tab to close before the bot fails.  Recommended: Enter a timeout value of at least 9 seconds. - Optional: Select a variable to hold the action output.

Using Find broken links action

The Find broken links action enables you to find links that are not working on a specific page or an entire website. The action stores the output to a CSV file and allows you to specify the encoding you to use to store the output.

Follow these steps to find broken links:

- In the Actions palette, double-click or drag the Find broken links action from the Browser package.
- In the Page or URL field, enter the URL of the page or website.
- In the Scope option, choose either check only this page or check the whole site.
- In the Save list to location field, specify the location of the CSV file.
- Select the Append to already existing csv file check box if you want to append the data to an existing CSV file.
- Select an option from the Encoding list to specify the encoding that you want to apply on the file.
 - ANSI
 - Unicode

- UTF-8

7. In the Number of parallel threads field, enter the number of parallel threads you want to run simultaneously.

Parallel threads means multiple processes running simultaneously to perform the same task which results in faster execution. Higher the number of parallel threads faster the execution of a task execution. For example, if 10 threads complete a task in two minutes, 20 threads complete a task in one minute.



Note: The maximum value you can provide in the field is 99.

8. In the Time out field, specify the maximum time the system must wait to receive a response from each URL link.
9. Click Save.

Clipboard package

The Clipboard package contains actions that enable you to automate using the Windows clipboard. Use the actions to copy a string value to the clipboard, copy the clipboard value to a string variable, and clear the clipboard.

Actions in the Clipboard package

The Clipboard package includes the following actions:

Action	Description
Clear	Clears the clipboard. This action will remove any value that is stored in the clipboard.
Copy from	Retrieves the values stored in the clipboard and stores it in the string variable that you select from the Assign the output to variable list. This action enables you to pass the value from the clipboard to other actions.
Copy to	Stores values in the clipboard. You can either enter the value or specify the string variable that contains the value in the Value field.

Comment package

Use the Comment package to insert a user-specified comment into your bot logic.

Action in the Comment package

The Comment package includes the following action:

Action	Description
Comment	Inserts a comment.  Note: A comment is saved and displayed as a single line. A comment with multiple lines is displayed as a single line, followed by an ellipsis when the comment is saved. Comments are ignored when the bot runs.

CSV/TXT package

The CSV/TXT package contains actions that enable you to open a CSV or text file, read data from that file, and assign the data to a Table variable. This package supports files encoded in ANSI, Unicode, UTF-8, or Windows-1251, and can process up to one million records.

Perform the following actions within the CSV/TXT package as part of using the set of available actions:

1. Open the file to be used in the automation. See [Using the Open action for CSV/TXT file](#) on page 547.



Note: For files containing large data sets, use actions from the Database package to automate create, read, and update operations. See [Using Connect action for database](#) on page 559.

2. Use the Read action to retrieve values from a CSV or TXT file and store them in a Table variable. See [Using Read action](#) on page 548.

To retrieve values row by row, use the For each row in CSV/TXT iterator in the Loop action to read values from each row in the file and assign it to a record variable. See [Using the For each row in CSV/TXT iterator](#) on page 693.

3. After you have automated the CSV/TXT-related tasks, close the file using the Close action. Enter the session name that was used to open the file with the Open action.

Related reference

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[User-defined variables](#) on page 869

Users and some actions create user-defined variables to temporarily hold values. Use this kind of variable to input values into an action (window title, login credential, or file path) or to accept the output of an action (values read from a file or a Boolean return).

Using the Open action for CSV/TXT file

This action enables you to specify the delimiter used in the file, whether to trim the spaces, and the encoding applied on the file.



Note: If there is a double quotation mark (") in the last element of the last line of the CSV/TXT file, at runtime the bot will encounter an error.

To open a CSV or text file, do the following:

1. Double-click or drag the Open action from the CSV/TXT package in the Actions palette.
2. Select any of the following options to specify the location of the CSV or text file to open:
 - Control Room file: Enables you to open a file from the Enterprise Control Room.

- Desktop file: Enables you to open a file from the device. This field also accepts the file path input as a string variable or global value.
 - Variable: Enables you to open a file by specifying a file variable.
3. Select the Contains header check box if the file contains a header row and you want to retrieve values from that row.
 4. Select any of the following options to specify the Delimiter used in the file:
 - Comma
 - Tab
 - Regional list separator: Enables you to specify the delimiter as configured in the regional settings of the Windows operating system. If the List Separator in the Windows regional settings is modified, then the CSV file should also contain that character as a delimiter.
 - Newline
 - Other: Enables you to specify a delimiter other than the options listed above.
 5. Select the Trim leading and Trim trailing check boxes to remove the leading and trailing spaces from the data extracted from the CSV/TXT file
 6. Select an option from the Encoding list to specify the encoding that is applied on the file. Data from the CSV/TXT file will be retrieved based on the selected encoding option even if the input file has a different encoding.
 - ANSI: Used to encode Latin alphabet.
 - UTF8: Can encode all possible characters.
 - UNICODE
 - Win1251: used to encode languages that use the Cyrillic script, including Bulgarian, Russian, and Serbian.
 - UTF-16LE: ignores the byte order mark (BOM) Unicode character at the beginning of file.
 - Default: identifies file encoding. This option supports UTF-8, UTF-16LE, and UTF-16BE file encoding.



Note: Shift-JIS files must use ANSI as encoding to read text file content.

7. Click Save.

Use the Read action to retrieve the data from CSV/TXT file and assign them to a table variable. You can use the loop action to retrieve each row of data from the file or table variable and assign them to the record variable for further operations.

- [Using Read action](#) on page 548
- [Using the For each row in CSV/TXT iterator](#) on page 693

Using Read action

Use the Read action to retrieve values from a CSV or TXT file and insert them into a Table variable in order to perform operations with the data values.

To retrieve values from a CSV/TXT file, do the following:

1. Double-click or drag the Read action from the CSV/TXT node in the Actions palette.
2. Enter the name of the session that you have used to open the CSV or text file in the Open action.
3. Select a Table variable from the Assign value to the variable list.
Create a variable if it does not already exist.

Perform operations with the values in the Table variable using the [Data Table package](#) on page 549.

Data Table package

The Data Table package contains actions that enable you to perform various operations on the values of table variables. Use these actions to join or merge content, search for specific values, insert rows and columns, remove duplicate rows, and write values to a file.

Actions in the Data Table package

The Data Table package includes the following actions:



Note: If you built a bot using actions from the Data Table package from Build 5322 or earlier, the actions will be missing when you open the bot with the default package version. You must reinsert the actions and repopulate the fields.

Action	Description
Assign	Assigns values to a table variable. You can use this action to manually enter the table data. - Select whether to create a table with or without values. - If you select to create a table with values, either manually enter the values or select a source table variable. - If you select to create a table without values, specify the number of rows and columns. - Select a table variable to hold the output. You can either select the source table variable to overwrite the values, or select a different table variable.
Change column type	Changes the data type of a column. - Select the Data table name from the drop-down list. - Select whether to specify the column by Name or Index. - If you select to specify by name, enter the column name. - If you select to specify by index, enter the column index. For example, to set a value to the first column, enter 0. - Select the new column data type from the drop-down list to to Number, Boolean, String, or Datetime. - If you select Datetime, you can format the values by selecting a predefined format or specifying a custom format. - To specify the format applied on the input data table variable, select an option either from the predefined format list or enter the value in a custom format. - Select a table variable to include the output. You can either select the source table variable to overwrite the values or select a different table variable.

Action	Description
Clear content	Clears the contents of the specified table variable. This action clears the content until the execution of the bot is completed. After the bot execution is completed, the original values of the table variables are restored. The action enables you to reuse an existing table variable to store values that are used only during the bot execution.  Note: The data type of the values must be same as the data type of the columns in the table variable.
Delete column	Deletes a specific column. • Select the Table variable name from the drop-down list. • Specify the column name or column index to delete.  Note: The index count starts from 0.
Delete row	Deletes a specific row.  Note: If the data table values were read from an Excel sheet, and you selected the Sheet contains a header option in the Open action, you cannot delete cells from the first row. • Select the Table variable name from the drop-down list. • Specify the row name or row index to delete.  Note: The index count starts from 0.
Get number of columns	Retrieves the number of columns and assigns it to a Number variable. You have the option to select the non-empty columns or include all the columns in the selection.
Get number of rows	Retrieves the number of rows and assigns it to a Number variable. You have the option to select the non-empty rows or include all the rows in the selection.
Insert column	Inserts a column from one table to another table. For destination table: • Select the destination table variable form the Enter into data table list. • Select where to insert the column: first index, last index, or enter the column index number.  Note: The index count starts from 0. For source table: • Select the source table variable from the Insert from table list. • Enter the name or index number of the column to insert.

Action	Description
Insert row	Inserts a row into the table. - Select the Table variable name from the drop-down list. - Select where to insert the row: first index, last index, or enter the row index number.  Note: The index count starts from 0.
Join	See Using Join action on page 552. Use the Join type output examples on page 553 to help you decide whether to use the Join or Merge action.  Note: If you built a bot using this action from package version 2.0.0-20200624-042148 or earlier, the action will be missing when you open the bot with the default package version. You must reinsert the action and repopulate the fields.
Merge	See Using the Merge action on page 555. Use the Merge output example on page 555 to help you decide whether to use the Join or Merge action.  Note: If you built a bot using this action from package version 2.0.0-20200624-042148 or earlier, the action will be missing when you open the bot with the default package version. You must reinsert the action and repopulate the fields.
Remove duplicate rows	Deletes duplicate rows (if any exist). Select the Table variable name from the drop-down list.
Search for a value	Searches for a specific value in the table, returns the row and column numbers in which the value occurs, and assigns the row and column numbers to a List variable. For example, if you search for the value abc that is available at the fourth row and third column of a table variable, the action returns 3, 2 as output. As the index number for the row and column starts with zero, the values in the output indicates the fourth row and third column. - Select the Table variable name from the drop-down list. - Enter the value to search for. - Select Match case to ensure the case matches the value searched.

Action	Description
Set cell value	Updates the value of a specific cell. • Select the Table variable name from the drop-down list. • Enter the row index. For example, to set a value to the first row, enter 0. • Select whether to specify the column by Name or Index. • If you select to specify by name, enter the column name. Capitalization is not important. • If you select to specify by index, enter the column index. For example, to set a value to the first column, enter 0. • Enter the value to set.
Sort	Sorts the table data by a column. This action enables you to sort the data by column data format (string, number, datetime, or Boolean). • Select the Table variable name from the drop-down list. • Specify the column name or column index to sort by. • Select the order in which to sort: ascending or descending.  Note: If you built a bot using this action from package version 2.0.0-20200624-042148 or earlier, the action will be missing when you open the bot with the default package version. You must reinsert the action and repopulate the fields.
Write to file	See Using Write to file action on page 556.



Example: [Example of extracting data from a web table](#) on page 888

Using Join action

Use the Join action to combine content from two table variables. This action enables you to combine content based on the shared values of a specific column in the tables and store the content into a third Table variable or one of the two source tables.

To join the content from two Table variables, do the following:

1. Double-click or drag Data table > Join.
2. Select the first Table variable to use from the Enter first data table name list.
3. Enter the name of the column from the first Table variable that contains the data to join.
4. Select the second Table variable to use from the Enter second data table name list.
5. Enter the name of the column from the second Table variable that contains the data to join.
6. Select an option to specify the type of join. For more information, see [Join type output examples](#) on page 553.
 - inner join: Returns only the records that have matching values in the selected columns in both tables.
 - left outer join: Returns all records from the first table, and the matched records from the second table.

- right outer join: Returns all records from the second table, and the matched records from the first table.
 - full outer join: Returns all records when there is a match in either left or right table.
7. Select the table variable to store the combined values from the Enter name of data table in which to join list.
 8. In the Assign value to variable list, select a string variable.

Join type output examples

Select a join type option based on your desired output. Use the examples below to guide your selection.

Inner join

Returns only the records that have matching values in the selected columns in both tables.

For example, if you have a table of employees and their departments, and a table of employees and their pay rates, this option will return a table of the employees that exist in both tables, and their departments and pay rates.

Table 1: Employees and Departments

Employee	Department
John	101
Jill	102
Mike	103
Betty	104
Cindy	105

Table 2: Employees and Pay rates

Employee	Pay rate
John	50
Betty	50
Mike	40
Jill	35
Dan	45

Table 3: Employees, Departments, and Pay rates

Employee	Department	Pay rate
John	101	50
Jill	102	35
Mike	103	40
Betty	104	50

Left outer join

Returns all records from the first table, and the matched records from the second table.

Using the example Tables 1 and 2, this option returns the following table:

Table 3: Employees, Departments, and Pay rates

Employee	Department	Pay rate
John	101	50
Jill	102	35
Mike	103	40
Betty	104	50
Cindy	105	

Right outer join

Returns all records from the second table, and the matched records from the first table.

This option returns the following table:

Table 3: Employees, Departments, and Pay rates

Employee	Department	Pay rate
John	101	50
Betty	104	50
Mike	103	40
Jill	102	35
Dan		45

Full outer join

Returns all records when there is a match in either left or right table.

This option returns the following table:

Table 3: Employees, Departments, and Pay rates

Employee	Department	Pay rate
John	101	50
Jill	102	35
Mike	103	40
Betty	104	50
Cindy	105	

Employee	Department	Pay rate
Dan		45

Using the Merge action

Use the Merge action to combine the contents of two tables when both source tables contain identical column headers. To combine tables that contain different column headers, use the Join action.

If one of the tables contains non-identical headers, then the merged table will contain the columns from the first source table with data from the second source table under the identical column headers, followed by the non-identical columns and data from the second source table.

To merge the content, perform these steps:

1. Double-click or drag Data table > Merge.
2. Select the first table variable you want to use from the Enter first data table name list.
3. Select the second table variable you want to use from the Enter second data table name list.
4. Select the table variable that you want to use to store the merged data from the Enter name of data table in which to merge list.
5. Click Save.

For more information, see [Merge output example](#) on page 555.

Merge output example

The Merge action combines data from two tables with identical column headers, and stores the merged content in a third table or one of the two source tables. These examples demonstrate the output of two tables with identical column headers and the output of two tables with differing column headers.

Output of tables with identical column headers

For example, if you have a table of employees hired in September and a table of employees that were hired in October, this option will return a table of all the employees, with the October hires merged below the September hires.

Table 1: Employees hired in September

Employee	Department	Pay rate
John	101	50
Jill	102	35

Table 2: Employees hired in October

Employee	Department	Pay rate
Mike	103	40
Betty	104	50

Table 3: All employees



Note: The column headers in the output table are always lowercase.

employee	department	pay rate
John	101	50
Jill	102	35
Mike	103	40
Betty	104	50

Output of tables with differing column headers

In this example, the second table has a different column header. As a result, the third table contains the columns from the first source table with data from the second source table under the identical column headers, followed by the non-identical columns and data from the second source table.

Table 1: Employees hired in September

Employee	Department	Pay rate
John	101	50
Jill	102	35

Table 2: Employees hired in October

Employee	Department	Salary
Mike	103	40
Betty	104	50

Table 3: All employees

employee	department	pay rate	salary
John	101	50	
Jill	102	35	
Mike	103		40
Betty	104		50

Using Write to file action

Use the Write to file action to write the data from a Table type variable to a CSV or TXT file.

To write data into a file, do the following:

1. Double-click or drag Data table > Write to file.
2. Select the Table variable that contains the data to write from the Data table name list.
3. Specify the location of the file in which to write the data in the Enter file name field.
4. Select the Create folders/files if it doesn't exist check box to create the file or folder that you specified in the Enter file name field.
5. Select an option to specify what to do when writing data in an existing file:
 - Append to the existing file

- Override existing file
6. Select an option from the Row delimiter list to specify the delimiter to use for rows.
 7. Select an option from the Column delimiter list to specify the delimiter to use for columns.
 8. Select an option from the Encoding list to specify the encoding that you want to apply on the file.
The default encoding is set to ANSI
 - ANSI
 - UTF-8
 - Unicode
 - Win1251
 9. In the Assign value to variable list, select a string variable.

Database package

Databases support internal operations of an enterprise by storing a variety of data, such as sales transactions, product catalogs, inventories, and customer profiles. Use the Database package to connect to a database, begin a transaction, and manipulate the stored data by retrieving, inserting, updating, deleting, and exporting it to a CSV file.

Before you start

Perform the following actions within the Database package as part of using the set of available actions:

1. Establish a connection with the database server using the Connect action.
See [Using Connect action for database](#) on page 559.
2. Choose from the following:
 - Use the Read from action to retrieve records from the database. [Using the Read from action](#) on page 567
 - If you are automating a task that involves making changes to the database, insert the Begin database transaction action, followed by the actions that automate the changes.
This action ensures that all records are updated or deleted in their entirety, and prevents accidental updates or deletions of incomplete data if the bot encounters an error during run time.
3. If you used the Begin database transaction action in this session, insert the End database transaction to commit the changes.
4. Every set of database actions ends with the Disconnect action to terminate the connection to the database server.

Actions in the Database package

The Database package includes the following actions:

Action	Description
Begin database transaction	Starts a database transaction. The actions that you insert between the Begin database transaction and End database transaction actions are treated as a single unit. The bot must run all of the actions successfully in order to update the database. This prevents a partial entry in the event that one of the actions fail. For example, in double-entry accounting every debit requires the recording of a credit. If a company receives \$5000 of products, the accountant must debit \$5000 to inventory and credit \$5000 to accounts payable. Insert the actions that record these entries between the Begin database transaction and End database transaction actions to ensure that either both entries are recorded or neither is recorded in the database. In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.
Connect	See Using Connect action for database on page 559.
Disconnect	Disconnects from a database. In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.
End database transaction	Commits all the database operations that were performed with the actions that followed the Begin database transaction action, under the condition that the bot successfully ran those actions. In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.
Export to data table	See Using the Export to data table action on page 566.
Insert/Update/Delete	Executes an INSERT, UPDATE, or DELETE statement from the database. - In the Session name field, enter the name of the session you used to connect to the database server in the Connect action. - In the Statement field, enter the SQL statement to insert, update, or delete the records. - Use an INSERT statement to create new records in a table: <pre>INSERT INTO table_name (column1, column2, column3, ...) VALUES (value1, value2, value3, ...);</pre> - Use an UPDATE statement to modify a record: <pre>UPDATE table_name SET column1 = value1, column2 = value2, ... WHERE condition;</pre> - Use a DELETE statement to remove a record: <pre>DELETE FROM table_name WHERE condition;</pre> - In the Timeout for the query in seconds field, specify the time within which the statement execution should stop, even if the execution is not completed.

Action	Description
Manage stored procedure	Creates, updates, and deletes a stored procedure within the specified database. A stored procedure is SQL code saved to the database, enabling you to run it repeatedly. - In the Session name field, enter the name of the session you used to connect to the database server in the Connect action. - In the Enter full command field, enter the command to create, update, or delete the stored procedure. You can specify input and output parameters for the command; you provide values or variables holding the values in the Run stored procedure action. ➔ Recommended: Declare a delimiter and use it to close the SQL statement. MySQL example: In this example, the bot checks if there is a procedure in the database named <code>sum_of_two</code>. If not, the bot creates a procedure that accepts two input parameters (<code>num1</code> and <code>num2</code>), adds them together, and produces the sum as the output parameter: <pre> DROP PROCEDURE IF EXISTS sum_of_two; DELIMITER \$\$ CREATE PROCEDURE sum_of_two(IN num1 INT,IN num2 INT,OUT sum INT) BEGIN SET sum := num1 + num2; END \$\$ </pre> - In the Timeout for the query in seconds field, specify the time within which the statement execution should stop, even if the execution is not completed.
Read from	See Using the Read from action on page 567.
Run stored procedure	See Using the Run stored procedure action on page 562.

Related reference

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[Variables overview](#) on page 866

Enterprise A2019 offers a variety of variables, each designed to hold specific types of data and is intended for specific use. Use the topics below to learn more about each variable and how to use them.

Using Connect action for database

Use the Connect action to establish a connection with the database server that you want to use to automate database-related tasks. This action supports Microsoft Access, Microsoft SQL Server, MySQL, Oracle, PostgreSQL, and SQLite database servers, as well as the use of CSV, Microsoft Excel, and TXT files as databases.

Specify the details of a database server and associate it with a session name. Use the session name provided in this action in the other actions so that you do not have to provide the details of the database server in those actions.

To establish a connection with a database server, follow these steps:

1. Double-click or drag the Connect action from the Database package in the Actions palette.
2. Enter a unique name for the session in the Session name field.
3. Select the Default or User defined connection option.
 - If you select the Default option, you can directly enter the connection string for any of the supported database types.

Use this option to connect to an Excel, CSV, or TXT file. See [Connection Strings by database type](#).



Note: To use an Excel, CSV, or TXT file as a database, you must first install a 32-bit ODBC driver on your device. ODBC drivers do not support the delete operation.

To ensure a more secure automation, use a Credential Vault variable for the connection string.

- If you select the User defined option, select the database type from the available options and complete the following fields based on the selection:

Database Type	Options
Microsoft SQL Server, PostgreSQL	• Server name: Enter the name of the database server you want to connect to. • Database name: Enter the database name. • Username: Enter the username you want to use to access the database server. To ensure a secure user name, select a Credential Vault variable. Otherwise, enter a value. • Password: Enter the password for the username you have provided. To ensure a secure password, select a Credential Vault variable. Otherwise, enter a value. • Instance name: Enter a name for this connection instance. Connect to a Microsoft SQL Server with Windows authentication on page 561
MySQL	Enter the same options as in the Microsoft SQL Server database type. Also, enter the port number. The default port number is 3306.
Microsoft Access, SQLite	Select the database file path from: • My bots folder • local device • existing file variable

Database Type	Options
Oracle	• Server name: Enter the name of the Oracle server you want to connect to. • Oracle system id (sid): Enter the system ID. • Username: Enter the username you want to use to access the Oracle server. To ensure a secure user name, select a Credential Vault variable. Otherwise, enter a value. • Password: Enter the password for the username you have provided. To ensure a secure password, select a Credential Vault variable. Otherwise, enter a value. • Port: Enter the port number. The default port number is 1521.



Note: The Database package does not include the JDBC driver for MySQL and Oracle. You can provide your jar file version for a specific database by downloading it from the MySQL or Oracle driver repository and uploading the jar file in your Enterprise Control Room using the User defined connection option.

4. Select a driver file from the My bots folder, the local device, or a file variable.
5. Click Save.

Choose from the following:

- Use the Read from action to retrieve records from the database.
[Using the Read from action](#) on page 567
- If you are automating a task that involves making changes to the database, insert the Begin database transaction action.

This action ensures that all records are updated or deleted in their entirety, and prevents accidental updates or deletions of incomplete data if the bot encounters an error during run time.

[Database package](#) on page 557

Connect to a Microsoft SQL Server with Windows authentication

Configure your device and the Connect action from the Database package to automate connecting to a Microsoft SQL Server with Windows NT authentication.

To use Windows NT authentication for connecting to the Microsoft SQL Server, follow these steps:

1. Download the latest JDBC driver from Microsoft.
<https://docs.microsoft.com/en-us/sql/connect/jdbc/download-microsoft-jdbc-driver-for-sql-server?view=sql-server-ver15>
2. Unzip the package and upload the `mssql-jdbc-7.2.2.jre8.jar` file to the Enterprise Control Room repository.
 - a) From the Automation Anywhere Enterprise web interface, select BOTS > My bots.
 - b) Click Upload files.
The icon is above the table of Files and folders.
 - c) Click Add files to select the .jar file.

d) Click Upload.

3. Locate the `sqljdbc_auth.dll` file in the `<installdir>\jdk11\bin` folder.
For example, `D:\A2019\jdk11\bin`
4. Copy the `sqljdbc_auth.dll` file to the following file paths:
 - `C:\Windows\System32`
 - `C:\Program Files\Automation Anywhere\Bot Agent\jre\bin`

This enables Windows authentication, because the JDBC driver cannot perform that by default.

5. Select the Default connection option.
6. Enter the connection string: `jdbc:sqlserver://localhost;databaseName=Test;integratedSecurity=true;`
7. Select the Use Specific database option.
8. Click Browse to select the drive file you uploaded in step two.
9. Click Save.

Choose from the following:

- Use the Read from action to retrieve records from the database.
[Using the Read from action](#) on page 567
- If you are automating a task that involves making changes to the database, insert the Begin database transaction action.

This action ensures that all records are updated or deleted in their entirety, and prevents accidental updates or deletions of incomplete data if the bot encounters an error during run time.

[Database package](#) on page 557

Using the Run stored procedure action

Stored procedures are a set of SQL statements that are created and stored in the database. These SQL statements might be complex and have to run multiple times. Use the Run stored procedure action to execute existing stored procedures.



Note: This action does not support Microsoft Access or SQLite database types.

To automate the task of executing a stored procedure, follow these steps:

1. Enter the name of the session you used to connect to the database server in the Connect action.
You do not have to provide the details of the database server here because you have already associated those details with the session name when using the Connect action.
2. Enter the name of the stored procedure.
3. Optional: Click Add parameter to provide an input parameter or configure an output parameter.
Select from the following parameter options:

Option	Steps
Input	Parameter is passed from the bot to the stored procedure. - Name: Enter the name of the parameter from the stored procedure.  Note: To reference a parameter without a name (such as when passing a value from another bot), enter the parameter, appended by the index number. For example, the first input parameter is <code>Input1</code>. - Value (optional): Enter a value or select a variable. - Type: Select the data type from the following options - BIGINT (number) - BINARY (Boolean) - BIT (number) - CHAR (string) - DATE (date time) Supported format yyyy-mm-dd - DECIMAL (number) - DOUBLE (number) Default choice for decimal values. - FLOAT (number) - INTEGER (number) Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647 - LONGVARBINARY (Boolean) - LONGVARCHAR (string) - NUMERIC (number) - REAL (number) - SMALLINT (number) Uses 2 bytes to store an integer with a value from -32,768 to 32,767 - TIME (date time) Supported format hh:mm:ss - TIMESTAMP (date time) Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds - TINYINT (number) Uses 1 byte to store an integer with a value from 0 to 255 - VARBINARY (Boolean) - VARCHAR (string) For example, if running the example function from the Manage stored procedure action, configure the following two input parameters and values for the <code>sum_of_two</code> function to add: - Parameter 1: num1, 5, TINYINT - Parameter 2: num2, 10, TINYINT

Option	Steps
Output	Parameter is passed from the stored procedure to the bot. - Name: Enter the name of the parameter from the stored procedure.  Note: To reference a parameter without a name (such as when passing a value from another bot), enter the parameter, appended by the index number. For example, the first input parameter is <code>Input1</code>. - Type: Select the data type from the following options - BIGINT (number) - BINARY (Boolean) - BIT (number) - CHAR (string) - DATE (date time) Supported format yyyy-mm-dd - DECIMAL (number) - DOUBLE (number) Default choice for decimal values. - FLOAT (number) - INTEGER (number) Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647 - LONGVARBINARY (Boolean) - LONGVARCHAR (string) - NUMERIC (number) - REAL (number) - SMALLINT (number) Uses 2 bytes to store an integer with a value from -32,768 to 32,767 - TIME (date time) Supported format hh:mm:ss - TIMESTAMP (date time) Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds - TINYINT (number) Uses 1 byte to store an integer with a value from 0 to 255 - VARBINARY (Boolean) - VARCHAR (string) When the bot runs, the action converts the database data type to an Enterprise A2019-supported data type. For example, if running the example <code>sum_of_two</code> function from the Manage stored procedure action, configure the output parameter: <code>sum, TINYINT</code>.

Option	Steps
InputOutput	Parameter can be used for both input and output. - Name: Enter the name of the parameter from the stored procedure.  Note: To reference a parameter without a name (such as when passing a value from another bot), enter the parameter, appended by the index number. For example, the first input parameter is Input1. - Value (optional): Enter a value or select a variable. - Type: Select the data type from the following options - BIGINT (number) - BINARY (Boolean) - BIT (number) - CHAR (string) - DATE (date time) Supported format yyyy-mm-dd - DECIMAL (number) - DOUBLE (number) Default choice for decimal values. - FLOAT (number) - INTEGER (number) Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647 - LONGVARBINARY (Boolean) - LONGVARCHAR (string) - NUMERIC (number) - REAL (number) - SMALLINT (number) Uses 2 bytes to store an integer with a value from -32,768 to 32,767 - TIME (date time) Supported format hh:mm:ss - TIMESTAMP (date time) Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds - TINYINT (number) Uses 1 byte to store an integer with a value from 0 to 255 - VARBINARY (Boolean) - VARCHAR (string)

- Enter the maximum number of records to retrieve.
You can limit the results of the execution.
- Optional: Enter a timeout value.
When the specified time expires, the statement execution stops even if the execution is not completed.
- Optional: Select the Export data to CSV option to save the retrieved data.



Note: The Export data to CSV option does not support Oracle Database or PostgreSQL Server database types. Use output parameters to retrieve values.

- a) Select the file path from the My bots folder, the local device, or an existing file variable.
- b) Select the CSV file encoding to be either ANSI, UNICODE, or UTF8.
- c) Select whether to export the CSV file with or without the column headers.

With column headers

CustomerName	City
Manny	Pittsburgh
Kate	Los Angeles
John	Boston

Without column headers

Manny	Pittsburgh
Kate	Los Angeles
John	Boston

- d) Specify whether to overwrite the file or append the data to the existing file if a CSV file with the same name exists.
7. Optional: Select a dictionary variable to hold the output if the stored procedure returns a value. Each output parameter name is a dictionary key which holds the corresponding parameter value. For example, if you assign the `sum_of_two` function output to `$Output$`, when the bot calls `$Output{sum}$`, the variable returns 15.



Note: If you do not know the output parameter name, use the default key `Output` appended by the parameter index number.

8. Click Save.

Using the Export to data table action

Use the Export to data table action to retrieve records from the database and store the retrieved data in a table variable.

To automate the task of selecting and saving a set of records, follow these steps:

1. Enter the name of the session you used to connect to the database server in the Connect action.
You do not have to provide the details of the database server here because you have already associated those details with the session name when using the Connect action.
2. Enter the SELECT statement to specify the column and table names.
This field supports SQL syntax. For example, `SELECT CustomerName, City FROM Customers`
3. Enter the maximum number of records to retrieve.
4. Optional: Enter a timeout value.
When the specified time expires, the statement execution stops even if the execution is not completed.

5. In the Assign to option, select the table variable to store the retrieved data.
6. Click Save.

Using the Read from action

Use the Read from action to retrieve records from the database and save the retrieved data in a CSV file. This action enables you to retrieve up to one million records from the database.

To automate the task of selecting and saving a set of records, follow these steps:

1. Enter the name of the session you used to connect to the database server in the Connect action.
You do not have to provide the details of the database server here because you have already associated those details with the session name when using the Connect action.
2. Enter the SELECT statement to specify the column and table names.
This field supports SQL syntax. For example, `SELECT CustomerName, City FROM Customers`
3. Enter the maximum number of records to retrieve.
4. Optional: Enter a timeout value.
When the specified time expires, the statement execution stops even if the execution is not completed.
5. Select the Export data to CSV option to save the retrieved data.
 - a) Select the file path from the My bots folder, the local device, or an existing file variable.
 - b) Select the CSV file encoding to be either ANSI, UNICODE, or UTF8.
 - c) Select whether to export the CSV file with or without the column headers.

With column headers

CustomerName	City
Manny	Pittsburgh
Kate	Los Angeles
John	Boston

Without column headers

Manny	Pittsburgh
Kate	Los Angeles
John	Boston

- d) Specify whether to overwrite the file or append the data to the existing file if a CSV file with the same name exists.
6. Click Save.

Example of migrating data from Excel to a database

In this example, you build a bot to transfer values from an Excel spreadsheet to a database using actions from the Database, Excel advanced, and Loop packages.

Before you start building your bot, create the following:

- Excel spreadsheet with the following values:

John	Williams	jwilliams@gmail.com
Sam	Li	sam.li@xyz.org
Carl	Miller	carl@carlmillerllc.com

- Access database table named CustomerT with the following columns:
 - FirstName
 - LastName
 - Email

To migrate values from a spreadsheet to a table in a database, perform the following steps:

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Open the spreadsheet:
 - a) Double-click or drag the Excel advanced > Open action .
 - b) Click Browse to provide the file path.
 - c) Select the option to open the file in Read-write.
3. Connect to the database:
 - a) Double-click or drag the Database > Connect action.
 - b) Select the User defined connection mode.
 - c) Select the Microsoft Access database type.
 - d) Click Browse to provide the file path.
4. Insert the Excel values into the database, row by row:
 - a) Double-click or drag the Loop action.
 - b) Select the Excel advanced > For each row in worksheet iterator.
 - c) In the Assign the current value to this variable, create the record variable `rExcelCurrentRow`.
 - d) Drag the Database > Insert/Update/Delete action into the Loop container.
 - e) Enter the following SQL statement:

```
INSERT INTO CustomerT (FirstName,LastName,Email) values
('$rExcelCurrentRow[0]$', '$rExcelCurrentRow[1]$', '$rExcelCurrentRow[2]$');
```

5. Disconnect from the database. Drag the Database > Disconnect action below the Loop container.
6. Close the spreadsheet. Double-click or drag Excel advanced > Close Spreadsheet action.
7. Click Save.

Related reference

[Database package](#) on page 557

Databases support internal operations of an enterprise by storing a variety of data, such as sales transactions, product catalogs, inventories, and customer profiles. Use the Database package to connect to a database, begin a transaction, and manipulate the stored data by retrieving, inserting, updating, deleting, and exporting it to a CSV file.

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

Datetime package

A datetime value consists of a date, time, and time zone. Automation Anywhere Enterprise stores datetime values in a Datetime variable. The Datetime package contains actions that enable you to perform various operations on datetime values. You can use these actions to manipulate and compare values in the Datetime variables.

Actions in the Datetime package

The actions in the Datetime package accept a variable as an input and assign the output to a variable. These actions enable you to compare two Datetime values, add to or subtract from a Datetime value, and convert a Datetime value to a string value.

The Datetime package includes the following actions:

Action	Description
Add	See Using the Add action on page 571.
Assign	See Using the Assign action on page 572.

Action	Description
Is after	Compares two Datetime variables and verifies if the value of the source variable is after the value available in the comparison variable, and stores the output to a Boolean variable. • Select the source variable from the Source date and time variable list, and select the variable you want to compare with from the Date and time variable to be compared to list. • Select the Datetime variable from the Assign the output to a variable list to specify the variable you want to use to assign the output. For example, if the value in the source variable is after the value in the comparison variable, the system stores <code>True</code> as the output in the Boolean variable. If the value in the source variable is not after the value in the comparison variable, the system stores <code>False</code> as the output in the Boolean variable.
Is before	Compares two Datetime variables and verifies if the value of source variable is before the value available in the comparison variable, and stores the output to a Boolean variable. • Select the source variable from the Source date and time variable list, and select the variable you want to compare with from the Date and time variable to be compared to list. • Select the Datetime variable from the Assign the output to a variable list to specify the variable you want to use to assign the output. For example, if the value in the source variable is before the value in the comparison variable, the system stores <code>True</code> as the output in the Boolean variable. If the value in the source variable is not before the value in the comparison variable, the system stores <code>False</code> as the output in the Boolean variable.

Action	Description
Is equal	Compares two Datetime variables and verifies if the value of the source variable is equal to the value available in the comparison variable, and stores the output to a Boolean variable. • Select the source variable from the Source date and time variable list, and select the variable you want to compare with from the Date and time variable to be compared to list. • Select the Datetime variable from the Assign the output to a variable list to specify the variable you want to use to assign the output. For example, if the value in the source variable is equal to the value in the comparison variable, the system stores <code>True</code> as the output in the Boolean variable. If the value in the source variable is not equal to the value in the comparison variable, the system stores <code>False</code> as the output in the Boolean variable.
Subtract	See Using the Subtract action on page 572.
To string	See Using the To string action on page 573.

Related reference

[Date time formats](#) on page 573

Automation Anywhere Enterprise provides various predefined formats and also allows you to specify a custom format when you convert a datetime value to a string value.

Using the Add action

Use the Add action to increase the value in the Datetime variable by a specified time value and unit. For example, you can use this action to increase the Datetime variable value by three hours or by three days.

To add a value to a Datetime variable, do the following:

1. Double-click or drag the Add action from the Datetime node in the Actions palette.
2. Select an option from the Source date and time variable list to specify the variable that contains the value to which you want to add the time unit.
3. Enter the value you want to add in the Time value to add field.
4. Select an option from the Time unit to add list to specify the time unit you want to add.

Choose from the following time unit options:

- Milliseconds
- Seconds
- Minutes
- Hours
- Days
- Weeks
- Months

- Years



Note: This action accounts for leap years. For example, if the action adds 28 days to February 1, 2020, the action output is February 29, 2020. Whereas, if the action adds 28 days to February 1, 2019, the action output is March 1, 2019.

5. Select the Datetime variable from the Assign the output to a variable list to specify the variable to which you want to assign the output.
6. Click Save.

To see the output value, convert the value in the Datetime variable to a String variable, then print the value with the Message Box action. For more information, see [Using the To string action](#) on page 573 and [Using the Message box action](#) on page 694.

Using the Assign action

Use the Assign action to assign one or more String variables, a user-entered value, or an existing Datetime variable into a Datetime variable.

To assign values to a Datetime variable, do the following:

1. Double-click or drag the To string action from the Datetime node in the Actions palette.
2. Select either the Enter the date time or Variable option.
 - If you have selected the Enter the date time option, do the following:
 - a. Enter the date time values or select a String variable.



Note: To enter multiple variables, separate them with single quotation marks. For example, to input the variables date1 and time1, enter 'date1*time1'.

- b. Select the date time format.

Choose from the prebuilt formats or provide a custom format. For more information about the prebuilt formats, see [Date time formats](#) on page 573.

- If you have selected the Variable option, select a variable from the Source date time variable list.
3. Select the variable to use to store the output from the Destination Datetime variable list.
 4. Click Save.

Using the Subtract action

Use the Subtract action to decrease the value in the Datetime variable by a specified time value and unit. For example, you can use this action to decrease the Datetime variable value by three hours or by three days.

To subtract a value from a Datetime variable, do the following:

1. Double-click or drag the Subtract action from the Datetime node in the Actions palette.
2. Select an option from the Source date and time variable list to specify the variable that contains the value from which you want to subtract the time unit.
3. Enter the value you want to subtract in the Time value to add field.
4. Select an option from the Time unit to add list to specify the time unit you want to subtract. Choose from the following time unit options:
 - Milliseconds
 - Seconds

- Minutes
- Hours
- Days
- Weeks
- Months
- Years



Note: This action accounts for leap years. For example, if the action subtracts 31 days from March 31, 2020, the action output is February 29, 2020. Whereas, if the action subtracts 31 days from March 31, 2019, the action output is February 28, 2019.

5. Select the Datetime variable from the Assign the output to a variable list to specify the variable to which you want to assign the output.
6. Click Save.

To see the output value, convert the value in the Datetime variable to a String variable, then print the value with the Message Box action. For more information, see [Using the To string action](#) on page 573 and [Using the Message box action](#) on page 694.

Using the To string action

Use the To string action to convert a datetime value to a string value. This action enables you to select a predefined format or specify a custom format for the output value.

You can select a predefined format for datetime or provide a custom format based on your requirements. See [Date time formats](#) on page 573.

To convert a datetime value to string, do the following:

1. Double-click or drag the To string action from the Datetime node in the Actions palette.
2. Select an option from the Source date and time variable list to specify the variable that contains the datetime value that you want to convert to a string value.
3. Select an option from the Formats list to specify the predefined format in which you want to store the string value.
4. Select the Custom format to specify a custom format based on your requirement.
5. Select the string variable that you want to use to store the converted value from the Assign the output to a variable list.
6. Click Save.

Date time formats

Automation Anywhere Enterprise provides various predefined formats and also allows you to specify a custom format when you convert a datetime value to a string value.

The To string action enables you to convert a datetime value to a string value. This action also enables you to select a predefined datetime format or specify a custom format.

Predefined datetime format

When you convert a datetime value to a string value, the predefined datetime formats are available in the Formats list. The following predefined datetime formats are available:

- BASIC_ISO_DATE: Converts the datetime value to a `yyyymmdd+offset` value string value.
- ISO_LOCAL_DATE: Converts the datetime value to a `yyyy-mm-dd` string value.
- ISO_OFFSET_DATE: Converts the datetime value to a `yyyy-mm-dd+offset` value string value. The offset value indicates the difference between the local time and UTC in hours and minutes.

- **ISO_DATE:** Converts the datetime value to a `yyyy-mm-dd+offset value` or `yyyy-mm-dd` string value. The system adds an offset value if it is available.
- **ISO_LOCAL_TIME:** Converts the datetime value to a `hh:mm:ss.SSS` string value.
- **ISO_OFFSET_TIME:** Converts the datetime value to a `hh:mm:ss.SSS+offset value` string value. The offset value indicates the difference between the local time and UTC in hours and minutes.
- **ISO_TIME:** Converts the datetime value to a `hh:mm:ss.SSS`, or `hh:mm:ss.SSS+offset value` string value. The offset value indicates the difference between the local time and UTC in hours and minutes.
- **ISO_LOCAL_DATE_TIME:** Converts the datetime value to a `yyyy-mm-ddThh:mm:ss.SSS` string value.
- **ISO_OFFSET_DATE_TIME:** Converts the datetime value to a `yyyy-mm-ddThh:mm:ss.SSS+offset value` string value. The offset value indicates the difference between the local time and UTC in hours and minutes.
- **ISO_ZONED_DATE_TIME:** Converts the datetime value to a `yyyy-mm-ddThh:mm:ss.SSS+offset value[zone id]` string value. The offset value indicates the difference between the local time and UTC in hours and minutes. The 'zone id' in the format represents the time zone.
- **ISO_DATE_TIME:** Converts the datetime value to a `yyyy-mm-ddThh:mm:ss.SSS`, `yyyy-mm-ddThh:mm:ss.SSS+offset value`, or `yyyy-mm-ddThh:mm:ss.SSS+offset value[zone id]` string value.
- **ISO_ORDINAL_DATE:** Converts the datetime value to a `yyyy-[day of the year]`, or `yyyy-[day of the year]+offset value` string value. For example, if the datetime value is 'January 25, 2018', it is formatted as '2018-25' where '25' indicates the day of the year.
- **ISO_WEEK_DATE:** Converts the datetime value to a `yyyy-[week of the year]-[day of the week]`, or `yyyy-[week of the year]-[day of the week]+offset value` string value. For example, if the datetime value is 'January 25, 2018', it is formatted as '2018-W4-4' where 'W4' indicates that it is the fourth week of the year and '4' indicates the day of that week.
- **ISO_INSTANT:** Converts the datetime value to a `yyyy-mm-ddThh:mm:ss.SSSZ` string value.
- **RFC_1123_DATE_TIME:** Converts the datetime value to a `[day of the week], [day of the month] [month in 'MMM' format] [year in 'YYYY' format] hh:mm:ss`, or `[day of the week], [day of the month] [month in 'MMM' format] [year in 'YYYY' format] hh:mm:ss+offset value` string value. For example, if the datetime value is '2018-01-25 10:15', it is formatted as 'Thu, 25 December 2018 10:15:00GMT'. The 'GMT' indicates that there is no offset available.

Custom datetime format

Automation Anywhere Enterprise offers predefined conventions that you can use to specify a custom datetime format. The following conventions are available:

- 'y': Enables you to specify a year as 'yy' or 'yyyy'.
- 'M': Enables you to specify a month as 'MM' or 'M'.
- 'd': Enables you to specify a day as 'dd' or 'd'.
- 'h' or 'H': Enables you to specify an hour as 'hh' or 'HH'.
- 'm': Enables you to specify a minute in an hour as 'mm'.
- 's': Enables you to specify a second in a minute as 'ss'.
- 'S': Enables you to specify a millisecond as 'SSS'.
- 'z': Enables you to specify a time zone such as 'Pacific Standard Time', 'Indian Standard Time', and so on.
- 'Z': Enables you to specify an offset time for a time zone such as '+0550' for 'Indian Standard Time'.

You can use the above convention to specify the custom format you want to use for converting a datetime value. Below are some of the examples that use the above convention:

Format	Sample output
yyyy-MM-dd	2018-09-30
yyyy-M-d	2020-9-8
dd-MM-yyyy	25-12-2018
yyyy-MM-dd HH:mm:ss	2018-25-12 23:50:55
hh:mm:ss.SSS	22:15:35.889
yyyy-MM-dd HH:mm:ss.SSS	2018-12-25 23:50:55.999
yyyy-MM-dd HH:mm:ss.SSS Z	2018-12-25 23:50:55.999 +0530

Delay package

Use the Delay package to add a timed delay to the logic.

You can use timed delay to add the amount of time a bot waits before moving to the next task. You can specify the amount of time in milliseconds or seconds.

Example: If we give a timed delay of 5 seconds, the bot will wait for 5 seconds and then execute the action following the delay.

The Delay package includes the following action:

Action	Description
Delay	Adds a timed delay. • Select the delay type as Regular or Random. • Select the Regular option to delay the operation for a fixed period of time. • If you select Random, specify the time range in the From and To fields for the system to select a random delay within the specified range. You can add Random delay with different waiting time for each bot run at a given command level without having to change the bot. Example: Use Random delay when running bots simultaneously on several machines through a WLM queue before executing a database or recorder, or the FTP action. This would reduce the number of concurrent requests made to a database or the FTP server and the performance of the systems will not be adversely impacted. • Select the time units in seconds or milliseconds.

Watch the following video on how to use the Delay actions:

Dictionary package

The Dictionary package contains actions that enable you to do various operations on dictionary-type values.

Dictionary data type

A dictionary is a collection of key-value pairs, in which each key has a value. It is similar to an entry in a dictionary where each word has a corresponding definition or explanation. The key is similar to the word and the definition or explanation is similar to its value. The properties of dictionary entries are as follows:

- Keys are unique within each dictionary variable. If you try to duplicate a key, you will overwrite its value.
- Key names cannot be changed.
- Keys are case-sensitive.
- Keys can contain leading and trailing whitespaces.

Each key-value pair in a dictionary is separated by a colon. The key-value pairs are separated from each other by commas. An example of a dictionary is as follows:

```
invoice = {'CustomerID': 9876, 'Location': 'XYZ', 'Amount': 12,34,567}
```

In the example, 'CustomerID', 'Location', and 'Amount' are keys and the corresponding value assigned to each key is separated by a colon.

Working with variables of dictionary data type

A dictionary variable can hold values of boolean, number, or string data subtype. When initializing a dictionary variable, you can select the Any data subtype in order to hold any of the three data subtypes. You can manually enter values by creating a new variable or selecting an existing one from the Variables menu, and then clicking Add.

Use a dictionary variable to hold [email](#) or [PDF](#) properties.

Actions in the Dictionary package

The following actions are available:

Action	Description
Assign	Assigns the value of the source dictionary to the destination dictionary variable. • Select the source dictionary variable from the drop-down list or create a new dictionary variable. • Select a variable or create one to hold the output.

Action	Description
Get	Verifies if a key exists in a dictionary variable and returns the corresponding value. • Select the dictionary variable from the drop-down list. • Enter the key name. • Select a dictionary variable or create one to hold the output.
Put	Assigns a value to a key in the dictionary. If the key is already associated with a value, that value is reassigned to a variable. • Select the dictionary variable from the drop-down list. • Enter the key name. • Select the new value to associate with the key. • Select the variable to hold the previous value.
Remove	Removes a value from the specified key. The removed value is assigned to a variable selected from the Assign removed item to variable list. Removes a value from the specified key and optionally assigns it to a variable selected from the Assign removed item to variable list. • Select the dictionary variable from the drop-down list. • Enter the key name. • Select the variable to hold the removed value.
Size	Retrieves the number of entries in the dictionary specified in the Dictionary variable field and assigns the output to a number variable selected from the Assign the output to variable list.

DLL package

A dynamic-link library (DLL) file contains a shared library of functions that can be used by Windows programs. The DLL package uses a .dll file as reference and calls functions from the bot.

Before you start

Perform the following actions within the DLL package as part of using the set of available actions:

1. Use the Open action to specify the location of the .dll file you want to use and session name. Use this same session name for the other actions. The .dll referenced is automatically added as a bot dependency.
2. Use the Run function action to run a function from the .dll and save its output value as a variable.
3. After running the required functions, close the .dll reference. It is important to close the .dll reference to free the memory of the operating system.

Windows and appropriate versions of Microsoft .NET Framework are available on the devices running the DLLs.

To review the bot launcher logs, navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip`. Each zipped folder contains a file with data on the code execution, which is useful for debugging.



Note: If the .dll file uses .NET functions or classes from another .dll file, you must add the second .dll file as a manual dependency of the bot.

[Bot dependencies](#) on page 884

When you import multiple DLLs that have one main DLL and other DLLs are referenced from it, ensure you have all the DLLs in one folder. Also, the referenced DLLs must be called using a session name that is different from the name used in the main DLL. Your bot execution will fail if the same session name is used in both the main and the referenced DLLs.

Actions in the DLL package

The DLL package includes the following actions:

Action	Description
Close	Closes the current session. In the Session name field, enter the name of the session.
Open	Opens the reference file. - In the Session name field, enter the name of the session. - In the File path field, specify the location of the path. Note: The DLL package supports only DLLs written in C#.
Run function (Legacy)	See Using the Run function action. Note: This action is called Run function (Legacy) starting from Enterprise A2019.16. The action is called Run function in Enterprise A2019.15 and previous releases.
Run function	See Using the Run function action on page 582.

Supported data types in DLL functions

The following table list the variables and data types that you can use as an input or output parameter in DLL functions.



Note: The Run function and Run function (Legacy) actions do not support any user-defined data types in the Parameter to the function or Assign output to variable field.

Variable type as input or output parameters	Supported data types
String	- Char - Byte - String - string - SByte

Variable type as input or output parameters	Supported data types
Number	• UInt16 • Int16 • UInt32 • Int32 • UInt64 • Int64 • Int • Single • Decimal • Float • Double
Boolean	• Boolean • bool
Datetime	• Datetime

Variable type as input or output parameters	Supported data types
List	• UInt16[] • Int16[] • Int32[] • Int64[] • Int[] • Char[] • Single[] • Decimal[] • Float[] • Double[] • Boolean[] • bool[] • Byte[] • String[] • Datetime[] • List<UInt16> • List<Int16> • List<Int32> • List<Int64> • List<Int> • List<Char> • List<Single> • List<Decimal> • List<Float> • List<Double> • List<Boolean> • List<bool> • List<Byte> • List<String> • List<Datetime> • List<SByte> • List<UInt32> • List<UInt64>

Variable type as input or output parameters	Supported data types
Datatable	• UInt16[,] • Int16[,] • Int32[,] • Int64[,] • Int[,] • Char[,] • Single[,] • Decimal[,] • Float[,] • Double[,] • Boolean[,] • bool[,] • Byte[,] • String[,] • Datetime[,] • Byte[,] • UInt32[,] • UInt64[,]
Dictionary	• Dictionary<String,UInt16> • Dictionary<String,Int16> • Dictionary<String,Int32> • Dictionary<String,Int64> • Dictionary<String,Int> • Dictionary<String,Char> • Dictionary<String,Single> • Dictionary<String,Decimal> • Dictionary<String,Float> • Dictionary<String,Double> • Dictionary<String,Boolean> • Dictionary<String,bool> • Dictionary<String,Byte> • Dictionary<String,String> • Dictionary<String,Datetime> • Dictionary<Int,String> • Dictionary<Decimal,String> • Dictionary<Boolean,String> • Dictionary<String,SByte> • Dictionary<String,UInt32> • Dictionary<String,UInt64>

Using the Run function (Legacy) action

Use the Run function (Legacy) action to run a function within the .d11 file and specify the parameters to pass a function and store the output as a variable.

- Use a dictionary variable to pass the parameters to a function. The dictionary key contains the parameter name to pass to a function.

- If the .dll file uses .NET functions or classes from another .dll file, you must add the second .dll file as a manual dependency of the bot.

[Bot dependencies](#) on page 884

- When you use Run function or the Run function (Legacy) action, ensure that you use the supported data types for DLL functions.

See [DLL package](#) on page 577.

Follow these steps to run a function:

1. In the Actions palette, double-click or drag the Run function (Legacy) action from the DLL package.
2. In the Session name field, enter the name of the session.
3. In the Enter the namespace field, specify the namespace.
You can specify any of the namespaces defined in the DLL file.



Note: Ensure that the value you have provided in the field is correct.



Important: This field is case-sensitive.

4. In the Enter the class name field, specify the name of the class.
You can specify the name of any classes available in the namespace.



Important: This field is case-sensitive.

5. In the Enter the name of function to be executed field, specify the name of the function to execute.
Ensure that the name you have provided is correct and available in the class specified in the previous step.



Important: This field is case-sensitive.

6. Optional: In the Parameters to the function list, select the variable that contains all the parameters needed by the function.

You can use Boolean, datetime, dictionary, list, number, string, or table variable types to pass parameters to the function.



Note: Use the dictionary subtype Any to enable the bot to pass parameters of different data types to the function including Boolean, numeric, and string.

Specify the dictionary key as the parameter name to provide the dictionary value as the parameter value. For example, you have a function `ReturnSum` that returns the sum of two numeric values and want to pass `Param1` and `Param2` as its parameters. Configure a dictionary variable with two keys: `Param1` and `Param2`, each with the value that you want to pass.

7. Optional: In the Assign output to variable list, select a variable to use to store the output of the function.

You can use Boolean, datetime, dictionary, list, number, string, or table variable types to store the output based on the type of output the function returns.

8. Click Save.

Using the Run function action

Use the Run function action to run a function within the .dll file and specify the parameters to pass a function and store the output as a variable.

- This action enables you to pass a parameter of any type. If you want to use a dictionary variable to pass the parameters to a function, use the Run function (Legacy) action.

[Using the Run function \(Legacy\) action](#) on page 581

- The Run function action does not support the use of Windows Forms.
- If the .dll file uses .NET functions or classes from another .dll file, you must add the second .dll file as a manual dependency of the bot.

[Bot dependencies](#) on page 884

- This action supports overloaded functions starting from Enterprise A2019.17. The action can handle .dll files that contain multiple functions of the same name. It calls the function based on the number of parameters passed.
- When you use Run function or the Run function (Legacy) actions, ensure that you use the supported data types for DLL functions.

[DLL package](#) on page 577

Follow these steps to run a function:

1. In the Actions palette, double-click or drag the Run function action from the DLL package.
2. In the Session name field, enter the name of the session.
3. In the Enter the namespace field, specify the namespace.

You can specify any of the namespaces defined in the DLL file.



Note: Ensure that the value you have provided in the field is correct.



Important: This field is case-sensitive.

4. In the Enter the class name field, specify the name of the class.
You can specify the name of any classes available in the namespace.



Important: This field is case-sensitive.

5. In the Enter the name of function to be executed field, specify the name of the function to execute.
Ensure that the name you have provided is correct and available in the class specified in the previous step.



Important: This field is case-sensitive.

6. Optional: In the Input parameters section, click the Add Parameters button.
 - a) In the DLL parameter details dialog box, enter the name of the parameter in the Parameter name field.
 - b) Select the data type of the parameter from the Parameter type list.
 - c) Enter the value you want to pass in the value field.

Repeat Step 6 to add multiple parameters.



Important: The names of the parameters you add and their order must be the same as in the DLL function.

7. Optional: In the Assign output to variable list, select a variable to use to store the output of the function.
You can use Boolean, datetime, dictionary, list, number, string, or table variable types to store the output based on the type of output the function returns.
8. Click Save.

Email package

The Email package contains actions to automate email-related tasks through Exchange Web Services (EWS), Microsoft Outlook, and other email servers. You can use these actions for sending, receiving, and modifying messages, folders, and the status of messages.

The Email package supports EWS, POP3, SMTP, and IMAP protocols and enables you to perform the following tasks:

- Manage and organize email messages and folders.
- Download attachments from emails to specific folders on devices.
- Extract data from emails to variables, to use as extracted data in other applications. For example, you can extract data from a sender's email and store it in a Microsoft Excel spreadsheet.



Note: If you want to automate an email-related task on a device using Microsoft Outlook, ensure that the Outlook application is open.

Before you start

Perform the following actions within the Email package as part of using the set of available actions:

1. Establish a connection with an email server using the Connect action.

While establishing the connection, specify the details and session name of the email server. Use this same session name for the other actions.

You do not have to establish a connection for the Forward, Reply, and Send actions because you will add the sender and email server details when you use these actions.

2. Use the actions to automate a task.
3. After you have automated all the email-related tasks, terminate the connection to the mail server using the Disconnect action.



Important: You must enable POP settings to automate an email-related task on the Gmail server using the POP3 protocol. See [Read Gmail messages using POP](#).

Actions in the Email package



Note: Some of the actions must be used within a Loop action. See [Using the For each mail in mail box iterator](#) on page 596.

Emails are retrieved based on the sequence of the folders listed in the inbox field. Within each folder, emails are retrieved based on received date and time in the last in, first out (LIFO) order. Additionally, you can apply filters on the following fields:

- Types of emails: All, Read, and Unread
- Subject
- From a specific folder
- From specific sender
- Before, on, or after received date

The Email package includes the following actions:

Action	Description
Change status	Changes the statuses of emails to read or unread. Use this action within a Loop action. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - Select the Read or Unread option to change the status of the email.  Note: POP3 servers do not support and maintain the read or unread status of emails.
Check if folder exists	Checks whether a folder with the name you specified exists in the email server. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - In the Folder name field, enter the name of the folder you want to check.  Note: This field is not case-sensitive. - In the Select the destination boolean variable list, select a Boolean variable to store the output of the existing folder. The output is either True (file exists) or False (does not exist).
Connect	See Using the Connect action on page 588.
Delete	Deletes the most recent email from the inbox. Use this action within a Loop action. In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.  Note: Microsoft Outlook does not currently support this action.
Delete all	Deletes read, unread, or all emails from the mail server. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - Select the All, Read, or Unread option to specify the type of email you want to delete.  Note: For an email server using the POP3 protocol, this action deletes all the email messages.  Note: Microsoft Outlook does not currently support this action.
Disconnect	Terminates the connection established with the email server. In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.
Forward	See Using the Forward action on page 590.

Action	Description
Move all	Moves an email from one folder to another in the email server. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - In the Destination folder path in mailbox field, provide the path to the location where you want to move the email. - Select which emails to move: All, Read, or Unread. - In the From a specific folder field, specify the folder from which to move the emails. For example, <code>Inbox/project1</code>.  Note: For an email server using the POP3 protocol, you can retrieve only from the inbox. - Optional: Specify any of the following conditions: - When subject contains: Enter keywords separated by a semicolon. How subject filter works when moving emails on page 598 - From specific senders: Enter senders' email addresses separated by a semicolon. - When received date is on or after or When received date is before: Select a datetime variable from the list.  Note: Because folders are not supported in Gmail, this action is not supported for Gmail.
Reply	See Using Reply action on page 592.
Save all attachments	Saves attachments from all emails on the email server to a specified folder.  Note: If connected to an Outlook server, images embedded in the emails are downloaded along with attachments. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - Select which emails to save: All, Read, or Unread. - In the Save attachments to folder field, specify the location to save the attachments.  Note: This field is not case-sensitive. - Overwrite file(s): select this option to overwrite an existing file with the same name. If this option is not selected, the downloaded attachment is saved with the same filename suffixed with a numeric value; it does not overwrite the existing file. You can save attachments with a filename that contains a TAB character.

Action	Description
Save attachments	Saves attachments from one email to a specified folder. Use this action within a Loop action.  Note: If connected to an Outlook server, images embedded in the emails are downloaded along with attachments. - In the Save attachments to folder field, specify the location to save the attachments.  Note: This field is not case-sensitive. - Overwrite file(s): select this option to overwrite an existing file with the same name. If this option is not selected, the downloaded attachment is saved with the same filename suffixed with a numeric value; it does not overwrite the existing file.
Save email	Saves an email message as an EML file to a folder. Use this action within a Loop action. - In the Session name field, enter the name of the session you used to connect to the email server in the Connect action. - In the Save emails to folder field, specify the location to save the email.  Note: This field is not case-sensitive. - Overwrite file(s): select this option to overwrite the existing file with the same name. If this option is not selected, the downloaded attachment is saved with the same filename suffixed with a numeric value; it does not overwrite the existing file.  Note: Microsoft Outlook does not currently support this action.
Send	See Using the Send action on page 594.

Related reference

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[Configuring email server](#) on page 589

The details regarding the mail server you provide when establishing a connection varies based on the email server you are connecting to.

[Using dictionary variable for email properties](#) on page 597

When you automate an email-related task, Automation Anywhere Enterprise retrieves various properties of an email and stores the values of these properties in a dictionary variable. These properties are stored in a dictionary variable when you use an email action within a loop action.

Using the Connect action

Use the Connect action to establish a connection with an email server. This is the first action you must use to automate an email-related task.

You can use EWS OAuth to authenticate with the Exchange server for email automation. Register your application with the Microsoft Identity platform to obtain the client ID and tenant ID.

Register an application

- When registering the application, set the redirect URI value to `https://outlook.office365.com` for the application.
- Select Yes to treat the application as a client.

This action enables you to provide the email server credentials and details, and associate this information with a session name. Use this same session name for the other Email actions, so you only have to provide the server information once.

To establish a connection with an email server, follow these steps:

1. In the Actions palette, double-click or drag the Connect action from the Email package.
2. Enter a session name.
3. In the Outlook, Email server, or EWS option, specify whether you want to establish a connection with Microsoft Outlook or a mail server.
 - If you have selected the Outlook option, you do not need to provide any additional details.
 - If you have selected the Email server option, complete the following fields:



Note: For information about the host and port to be used for the various mail servers, see [Configuring email server](#) on page 589.

- Host: Enter the name of the mail server you want to connect.



Note: This field is not case-sensitive.

- Port: Enter the port you want to use to establish the connection.
- Username: Click Credential to use a value available in the Credential Vault or String to manually enter a username. [Credentials and lockers](#)
- Password: Click Credential to use a value available in the Credential Vault or String to manually enter a password. [Credentials and lockers](#)
- Use secure connection (SSL/TLS): Select this option if you want to use a secure connection with the mail server.
- Protocol: Select the IMAP or POP3 option to specify the protocol used for the mail server.
- If you have selected the EWS option, complete the following fields:
 - Username: Enter the username you want to use to access the mail server.
For example, john.smith@myCompanyName.com
Choose the username as a Credential or String.
 - Password: Enter the password for the username you have provided.
Choose the username as a Credential or String.
 - Optional: Domain name:

- If you are an Office 365 customer and you leave this field blank, Automation Anywhere Enterprise uses smtp.office365.com to connect to the server.
- If you are an Office 365 customer and you have entered a domain name in the username field, you must enter smtp.office365.com in this field.
- If you are not an Office 365 customer, enter your company domain name. Otherwise, Automation Anywhere Enterprise uses the domain name you provided in the Username field.
- Exchange Version: Select the version your organization is using:
 - Exchange2010
 - Exchange2010_SP1
 - Exchange2010_SP2
 - Exchange2007_SP1
- Authentication type: Select the authentication type:
 - Basic
 - OAuth2

If you select OAuth2, the Username, Password, Client ID, and Tenant ID fields are mandatory to establish the connection to the server. The recommended practice is to use OAuth Authentication for enhanced security.
- Client ID and Tenant ID: Enter the unique client and tenant IDs generated when you registered the application in the Microsoft Azure portal.
- Authorize: Click this option to sign in to your account, accept the permissions requested to authenticate, and establish a connection with the EWS OAuth server.



Note: You have to establish the connection only when connecting for the first time.

4. Click Save.

Configuring email server

The details regarding the mail server you provide when establishing a connection varies based on the email server you are connecting to.

The following table provides information about the host name and the port you must use when establishing a connection to the specified mail server:

Server	For reading or fetching emails	For sending emails
Microsoft Outlook/Microsoft Office 365	Host: outlook.office365.com Port: 993	Host: outlook.office365.com, Port: 993 Host:smtp.office365.com Port: 587
Gmail	Host: imap.gmail.com Port: 993	Host: smtp.gmail.com Port: 587
Yahoo	Host: imap.mail.yahoo.com Port: 993	Host: smtp.mail.yahoo.com Port: 465 or 587

MSN	Host: imap-mail.outlook.com	Host: smtp-mail.outlook.com
	Port: 993	Port: 465 or 587
	For POP3:	
	Host: pop-mail.outlook.com	
	Port: 993	

Additional configuration for Gmail and Yahoo

If you are using a Gmail or Yahoo account to automate an email-related task, ensure that the option to allow access for less secured apps is enabled. This is required to enable a TaskBot to send email using a Gmail or Yahoo account.

To enable access for less secure apps:

1. Log in to your Gmail or Yahoo account.
2. Go to account settings.
3. Enable the option to allow less secure apps.

Using the Forward action

Use the Forward action to forward emails and attachments to one or more recipients. To forward emails as plain text or HTML through Exchange Web Services (EWS), Microsoft Outlook, or other email servers, use this action within a Loop action.

To forward emails, follow these steps:

1. In the Actions palette, double-click or drag the Forward action from the Email package.
2. In the To address field and the optional Cc and Bcc fields, enter the email addresses of the recipients.



Note: The To address, Cc, and Bcc fields are not case-sensitive.

3. Optional: In Attachment, select the attachment from a location:
 - Control Room file: Enables you to select an attachment that is available in a folder.
 - Desktop profile: Enables you to select an attachment that is available on your device.

To attach multiple files, separate each file path with a semicolon.

 - Variable: Enables you to specify the file variable that contains the location of the attachment.
4. Optional: Select the Validate if attachment is missing check box to verify that you have attached a file and the attached file exists.

Option	Result
The Validate if attachment is missing check box is selected	If a file is not attached, the email is not sent and the bot encounters an error.
The Validate if attachment is missing check box is not selected	The email is sent even if a file is not attached.

5. In the Plain text or HTML options, select the format that you want to use.
6. Optional: Enter the content you want to send along with the email in the Message field.

The email will be appended to the message you have specified.

7. Optional: Select the Include Go Green message at the end of the email check box.

The Go Green message appends the following text to the bottom of the email body: `Please consider the environment before printing. Let's Go Green!`

8. Select the Email server, EWS or Outlook option from the Send email via list to specify whether to send the emails using Microsoft Outlook or a mail server.

- If you have selected the Outlook option, you do not need to provide any additional details.
- If you have selected the Email server option, complete the following fields:



Note: For information about the host and port to be used for the various mail servers, see [Configuring email server](#) on page 589.

- Email server host: Enter the host you want to connect.



Note: If you use the host Outlook.office365.com, there is a limit of 30 messages sent per minute and 10,000 recipients per day.

- Email server port: Enter the port you want to use to establish the connection.
- Use secure connection (SSL/TLS): Select this option if you want to use a secure connection with the mail server.
- My server requires authentication: Select this option if the server requires credentials for access.
 - Username: Enter the username you want to use to access the mail server.
Choose the username as a Credential or String.
 - Password: Enter the password for the username you have provided.
Choose the password as a Credential or String.
- If you have selected the EWS option, complete the following fields:
 - Username: Enter the username you want to use to access the mail server.
For example, john.smith@myCompanyName.com
Choose the username as a Credential or String.
 - Password: Enter the password for the username you have provided.
Choose the username as a Credential or String.
 - Optional: Domain name:
 - If you are an Office 365 customer and you leave this field blank, Automation Anywhere Enterprise uses smtp.office365.com to connect to the server.
 - If you are an Office 365 customer and you have entered a domain name in the username field, you must enter smtp.office365.com in this field.
 - If you are not an Office 365 customer, enter your company domain name. Otherwise, Automation Anywhere Enterprise uses the domain name you provided in the Username field.
 - Exchange Version: Select the version your organization is using:
 - Exchange2010
 - Exchange2010_SP1
 - Exchange2010_SP2
 - Exchange2007_SP1
 - Authentication type: Select the authentication type:

- Basic
- OAuth2

If you select OAuth2, the Username, Password, Client ID, and Tenant ID fields are mandatory to establish the connection to the server. The recommended practice is to use OAuth Authentication for enhanced security.

- Client ID and Tenant ID: Enter the unique client and tenant IDs generated when you registered the application in the Microsoft Azure portal.
- Authorize: Click this option to sign in to your account, accept the permissions requested to authenticate, and establish a connection with the EWS OAuth server.



Note: You have to establish the connection only when connecting for the first time.

9. Click Save.

Using Reply action

Use the Reply action to send a response to an email with the same subject.

To send a reply to emails as plain text or HTML through Exchange Web Services (EWS), Microsoft Outlook, or other email servers, use this action within a Loop action. This action does not include any files attached to the original email.

Follow these to reply to an email:

1. In the Actions palette, double-click or drag the Reply action from the Email package.
2. In the Cc and Bcc fields, enter the email address of additional recipients.



Note: The Cc and Bcc fields are not case sensitive.

3. Optional: In Attachment, select the attachment from a location:
 - Control Room file: Enables you to select an attachment that is available in a folder.
 - Desktop profile: Enables you to select an attachment that is available on your device.

To attach multiple files, separate each file path with a semicolon.

 - Variable: Enables you to specify the file variable that contains the location of the attachment.
4. Optional: Select the Validate if attachment is missing check box to verify that you have attached a file and the attached file exists.

Option	Result
The Validate if attachment is missing check box is selected	If a file is not attached, the email is not sent and the bot encounters an error.
The Validate if attachment is missing check box is not selected	The email is sent even if a file is not attached.

5. In the Plain text or HTML options, select the format that you want to use.
6. Optional: Enter the content you want to send along with the email in the Message field.
The email will be appended to the message you have specified.
7. Optional: Select the Include Go Green message at the end of the email check box.
The Go Green message appends the following text to the bottom of the email body: `Please consider the environment before printing. Let's Go Green!`

8. Select the Email server, EWS or Outlook option from the Send email via list to specify whether to send the emails using Microsoft Outlook or a mail server.
 - If you have selected the Outlook option, you do not need to provide any additional details.
 - If you have selected the Email server option, complete the following fields:



Note: For information about the host and port to be used for the various mail servers, see [Configuring email server](#) on page 589.

- Email server host: Enter the host you want to connect.



Note: If you use the host Outlook.office365.com, there is a limit of 30 messages sent per minute and 10,000 recipients per day.

- Email server port: Enter the port you want to use to establish the connection.
- Use secure connection (SSL/TLS): Select this option if you want to use a secure connection with the mail server.
- My server requires authentication: Select this option if the server requires credentials for access.
 - Username: Enter the username you want to use to access the mail server.
Choose the username as a Credential or String.
 - Password: Enter the password for the username you have provided.
Choose the password as a Credential or String.
- If you have selected the EWS option, complete the following fields:
 - Username: Enter the username you want to use to access the mail server.
For example, john.smith@myCompanyName.com
Choose the username as a Credential or String.
 - Password: Enter the password for the username you have provided.
Choose the username as a Credential or String.
 - Optional: Domain name:
 - If you are an Office 365 customer and you leave this field blank, Automation Anywhere Enterprise uses smtp.office365.com to connect to the server.
 - If you are an Office 365 customer and you have entered a domain name in the username field, you must enter smtp.office365.com in this field.
 - If you are not an Office 365 customer, enter your company domain name. Otherwise, Automation Anywhere Enterprise uses the domain name you provided in the Username field.
- Exchange Version: Select the version your organization is using:
 - Exchange2010
 - Exchange2010_SP1
 - Exchange2010_SP2
 - Exchange2007_SP1
- Authentication type: Select the authentication type:
 - Basic
 - OAuth2

If you select OAuth2, the Username, Password, Client ID, and Tenant ID fields are mandatory to establish the connection to the server. The recommended practice is to use OAuth Authentication for enhanced security.

- Client ID and Tenant ID: Enter the unique client and tenant IDs generated when you registered the application in the Microsoft Azure portal.
- Authorize: Click this option to sign in to your account, accept the permissions requested to authenticate, and establish a connection with the EWS OAuth server.



Note: You have to establish the connection only when connecting for the first time.

9. Click Save.

Using the Send action

Use the Send action to send an email. This action enables you to send an email to one or more recipients from Microsoft Outlook or a mail server, attach files, and select to send the email in plain text or HTML format.

The Send action enables you to attach multiple files of various formats to an email. There is no restriction on the type of file you can attach or its size. However, restrictions implemented by the mail server you are using to send an email apply. For example, a task will fail if the files you have attached to the email you are sending do not adhere to the restrictions applied by the mail server.

To send an email from a Gmail or Yahoo account, enable access to a less secure app for that account. See [Configuring email server](#) on page 589.

1. In the Actions palette, double-click or drag the Send action from the Email package.
2. In the To address field and the optional Cc and Bcc fields, enter the email addresses of the recipients.



Note: The To address, Cc, and Bcc fields are not case-sensitive.

3. In the Subject field, enter the subject for the email.
4. Optional: In Attachment, select the attachment from a location:
 - Control Room file: Enables you to select an attachment that is available in a folder.
 - Desktop profile: Enables you to select an attachment that is available on your device.

To attach multiple files, separate each file path with a semicolon.

 - Variable: Enables you to specify the file variable that contains the location of the attachment.
5. Optional: Select the Validate if attachment is missing check box to verify that you have attached a file and the attached file exists.

Option	Result
The Validate if attachment is missing check box is selected	If a file is not attached, the email is not sent and the bot encounters an error.
The Validate if attachment is missing check box is not selected	The email is sent even if a file is not attached.

6. In the Plain text or HTML options, select the format that you want to use.
7. Optional: Enter the content you want to send along with the email in the Message field.
The email will be appended to the message you have specified.
8. Optional: Select the Include Go Green message at the end of the email check box.

The Go Green message appends the following text to the bottom of the email body: Please consider the environment before printing. Let's Go Green!

9. Select the Email server, EWS or Outlook option from the Send email via list to specify whether to send the emails using Exchange Web Services (EWS), Microsoft Outlook, or a mail server.
 - If you selected the Outlook option, you do not have to provide any additional details.



Note: Multiple accounts or shared mailboxes are not supported on the local system. Set up only one account or mailbox to access mails using bots.

Option	Steps
Email server	For information about the host and port to be used for the various mail servers, see Configuring email server on page 589. • From address Enter the email address.  Note: If the mail server does not support sending an email using an alias email address, use the same email ID in the From address as provided in the Username field while configuring the mail server. • Email server host: Enter the host you want to connect.  Note: If you use the host Outlook.office365.com, there is a limit of 30 messages sent per minute and 10,000 recipients per day. • Email server port: Enter the port you want to use to establish the connection. • Use secure connection (SSL/TLS): Select True or False, or insert a Boolean variable. • My server requires authentication: Select True or False, or insert a Boolean variable. • Username: Enter the username you want to use to access the mail server. Choose the username as a Credential or String. • Password: Enter the password for the username you have provided. Choose the password as a Credential or String.

Option	Steps
EWS	• Username: Enter the username you want to use to access the mail server. For example, john.smith@myCompanyName.com Choose the username as a Credential or String. • Password: Enter the password for the username you have provided. Choose the username as a Credential or String. • Optional: Domain name: • If you are an Office 365 customer and you leave this field blank, Automation Anywhere Enterprise uses smtp.office365.com to connect to the server. • If you are an Office 365 customer and you have entered a domain name in the username field, you must enter smtp.office365.com into this field. • If you are not an Office 365 customer, enter your company domain name. Otherwise, Automation Anywhere Enterprise uses the domain name you provided in the Username field. • Exchange Version: Select the version your organization is using: • Exchange2010 • Exchange2010_SP1 • Exchange2010_SP2 • Exchange2007_SP1

10. Click Save.

Using the For each mail in mail box iterator

You must use certain Email actions within a Loop action. Use the For each mail in mail box iterator to repeat a set of actions on all the emails within the specific parameters.

First, connect to the email server. [Using the Connect action](#) on page 588

You must use the following Email actions within a loop:

- Change status
- Delete
- Save attachments
- Save email

To use an Email action within a loop, follow these steps:

1. Double-click or drag the Loop action from the Loop package in the Actions palette.
2. Select the For each mail in mail box option from the Iterator list.
3. In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.
4. In the ALL, READ, or UNREAD options, specify the type of email to retrieve from the email server.



Note: For an email server that uses the POP3 protocol, all emails are retrieved.

5. Optional: Specify the folder from which you want to retrieve the emails.

- Microsoft Outlook and Yahoo: You can specify the name of the folder.

For example, `Inbox`, `Sent`, `Inbox/Sales`, `Inbox/IT` and so on. The `Sales` and `IT` folders in this example are user-created folders and not available by default.

- Gmail:

- To retrieve emails from the default folders, you must use `[Gmail]/FOLDER`, except for the `Inbox` folder.

For example, `[Gmail]/Draft`, `[Gmail]/Important`, `[Gmail]/Trash`, and so on.

- To retrieve emails from the folders you have created or the `Inbox` folder, you must specify the folder names as they are.

For example, if you have created folders called `Bank` and `Sports` in your Gmail, specify `Bank` and `Sports` without the `[Gmail]` prefix to retrieve emails from these folders.

- Optional: In the When subject contains field, specify a value to retrieve emails containing the value you specified in their subject.
 - Optional: In the From specific senders field, specify the email addresses to retrieve the emails.
 - Optional: In the When received date is on or after list, select an option to retrieve specific emails on or after a certain date.
 - Optional: In the When received date is on or before list, select an option to retrieve specific emails on or before a certain date.
- If you have specified values for Steps 6 through 9, the system retrieves only those emails that meet all the criteria. For example, if you specify `Bank` in Step 5, `Statement` in Step 6, and `abcbank@xyz.com` in Step 7, the system retrieves emails from the `Bank` folder that contain `Statement` in the subject and were received from the `abcbank@xyz.com` email address.
- In the Plain text or HTML options, select the format that you want to use.
 - Optional: In the Assign the current value to variable list, select or create a dictionary variable.
- The dictionary variable stores the properties of each email. [Using dictionary variable for email properties](#) on page 597.
- Click Save.

Insert a Message Box action into the Loop container to print the subject of each email. Use the following message body, substituting the generic variable name for the one you used in Step 10:

```
$dictionaryVar{emailSubject}$
```

Using dictionary variable for email properties

When you automate an email-related task, Automation Anywhere Enterprise retrieves various properties of an email and stores the values of these properties in a dictionary variable. These properties are stored in a dictionary variable when you use an email action within a loop action.

Some of the email properties that Automation Anywhere Enterprise retrieves are its subject, recipients, senders, message, and received date and time. The email properties are stored in a dictionary variable within the following dictionary keys:

- `emailSubject`
- `emailFrom`
- `emailTo`
- `emailCc`
- `emailBcc`
- `emailMessage`
- `emailReceivedTime`

- emailReceivedDate

The system automatically associates the properties of an email with the appropriate dictionary keys. You can use the values stored in these dictionary keys in another task, store them in a database, or for any other purpose. These keys are available in the system and you must use them as specified above. For example, if you have created a dictionary variable 'Test' and want to display the subject and sender of an email in a message prompt, you must enter `Test{emailSubject}` and `Test{emailFrom}` in the appropriate fields.

If you press F2 to use a variable in a field, you must select **Test** from the Choose a variable list and enter `emailSubject` in the Dictionary key field in the Insert a variable dialog box to store the subject of an email in that field. Similarly, you can enter `emailFrom` in the Dictionary key field to use the email address of the sender of an email in a field.

The dictionary key variable is required for all email-related tasks you automate from Microsoft Outlook and any mail server if you want to use the email properties. You can use the dictionary key variable for the following Email actions:

- Change status
- Delete
- Forward
- Reply
- Save attachments
- Save email



Note: The time required to save an email varies based on the size of the attachments available in that email.

How subject filter works when moving emails

In the Move all action in the Email package, learn how the subject filter works in order to move your emails from one folder to another in the email or Microsoft Outlook server.

You can use the keywords in the email subject field to filter emails. If Keywords are added within quotes , the bot will look for an exact match of keywords in the subject field to filter and retrieve emails.

How subject filter works in email server and Outlook

The filter works the same way for an email or outlook server when the subject field contains single or multiple texts.

Single subject	Email server and Outlook
Single text within double quotation marks	Retrieves emails with the exact subject text and is case-sensitive. Example: <code>[Subject]=["Automation"]</code> : The filter retrieves emails where the subject text includes "Automation" as an exact word.
Multiple text within double quotation marks	Retrieves emails with the exact subject text and is case-sensitive. Example: <code>[Subject]=["Automation Anywhere"]</code> : The filter retrieves emails where subject text includes "Automation Anywhere" as an exact phrase.
Single text without double quotation marks	Retrieves emails that have the similar text and is not case-sensitive. Example: <code>[Subject]=[Automation]</code> : The filter searches and retrieves emails where the subject text includes Automation.

Single subject	Email server and Outlook
Multiple text without double quotation marks	Retrieve emails with any text or combination of text and is not case-sensitive. Example: [Subject]=[Automation Anywhere]: The filter searches and retrieves emails where subject text includes Automation or Automation Anywhere.

The filter works differently for an email and outlook server when the subject field contains multiple subjects separated by semi-colon.

Multiple subjects separated by semicolon	Email server	Microsoft Outlook
Subjects within double quotation marks	Retrieve emails for each subject that is an exact match and is case-sensitive. Example: [Subject 1] =["Delivery Failure"]; [Subject 2] =["Mail server not found"] Individual subjects separated by a semicolon with an exact match are searched. The filter retrieves emails with the subject line "Delivery Failure" and/or "Mail server not found".	Retrieves emails with the complete subject line that is an exact match including the semicolon and double quotation marks. Example: [Subject 1] =["Delivery Failure"]; [Subject 2] =["Mail server not found"], separated by a semicolon. The filter retrieves emails with the subject line as one string that is an exact match with the semicolon, such as "Delivery Failure ; Mail server not found".
Subjects without double quotation marks	Retrieve emails for each subject and is not case-sensitive. Example: [Subject 1]=[Delivery Failure];[Subject 2]=[Mail server not found] The filter retrieves emails that include the subject line with text as Delivery Failure or Mail server not found.	Retrieve emails with the complete subject line including the semicolon. Example: [Subject 1]=[Delivery Failure]; [Subject 2]=[Mail server not found], separated by a semicolon. The filter retrieves emails with the subject line that includes text as one string with the semicolon but is not an exact match, such as: Delivery Failure ; Mail server not found or delivery failure ; mail server not found.

Multiple subjects separated by semicolon	Email server	Microsoft Outlook
Some subject in double quotation marks and some without double quotation marks	Retrieve emails for each subject. Subjects within double quotation marks are an exact match. Subjects without double quotes are not case-sensitive. Example: [Subject 1]=[Delivery Failure];[Subject 2] = ["Mail server not found"] - For Subject 1, the filter searches and retrieves emails that include the text in the subject line. - For Subject 2, the filter searches and retrieve emails with the exact text in the subject line.	Retrieve emails with the complete subject line that is an exact match including the semicolon. Example: [Subject 1]=[Delivery Failure];[Subject 2]= ["Mail server not found"], separated by a semicolon. The filter retrieves emails with the subject line as one string that is an exact match with the semicolon, such as: Delivery Failure ; Mail server not found.

Error handler package

The Error handler package contains actions that enable you to easily handle exceptions that a bot encounters and transfers control to the other actions within that bot.

The Error handler actions enable you to separate the actions that you want to use to perform a task from the actions that you want to use to handle an exception. Handling exceptions ensures that a bot completes a task when it encounters an error.

Actions in the Error handler package

The Error handler package includes the following actions:

Action	Description
Try	Enables you to specify a sequence of actions that might encounter an error. If the bot encounters an error from running the actions inside of the Try action, it attempts the actions inside of the Catch action.
Catch	Enables you to specify an alternative sequence of actions to run, and an optional contingency, if the bot encounters an error while running any of the actions in the Try action. You can assign an exception message or line number to a variable, and then insert the variable in a Log to file, Message box, or Email > Send action. You can use the actions from the Screen package to capture a screenshot of a window or application when the error occurs. You can use the Catch action multiple times in a bot to handle various exceptions. This enables you to run a different set of actions based on the exception encountered.

Action	Description
Finally	Enables you to specify the actions that you want to run regardless if the bot encounters an error or not. The finally statement enables you to execute code after try and catch, regardless of whether an exception occurs or not.
Throw	Displays a custom message if the bot encounters an error. Specify the message you want to display in the Please enter exception message field.

Using the actions in the Error handler package

In this example, you have a bot that reads data from a Microsoft Excel file and stores it in a database. The bot might encounter an error if the required file is not available or while updating a table in the database. Use the following methods to handle the errors:

- Exception 1:
 - The Microsoft Excel spreadsheet from which you want to extract data is not available.
 - How to handle: Use another file that contains the same data.
- Exception 2:
 - The table that you want to use to store the data is not available in the database.
 - How to handle: Display a message that the required table is not available.

Based on this example, perform the following to handle the mentioned exceptions:

1. Insert all the actions that are for reading the data from the Microsoft Excel spreadsheet and storing the extracted data into a table in the database within the Try action.
2. Insert the actions to run for the following exceptions within the Catch action:
 - a. Exception 1: Insert the actions to use the alternate file that contains the same data.
 - b. Exception 2: Insert the Message box action to display a relevant message.
3. Insert the Database > Disconnect action to terminate the connection with the database within the Finally action.

Regardless of whether the bot encounters an error or not, it must terminate the connection it established with the database.

Watch the following video on how to use the Error handler package:

Excel basic package

The Excel basic package contains actions that enable you to automate many of the repetitive tasks in XLSX workbooks. You use these actions when Microsoft Excel is not available on the device that you want to use to automate Microsoft Excel-related tasks.

Choosing the Excel package in Enterprise A2019

Enterprise A2019 includes packages to support three types of Microsoft Excel usage. For optimal results, use the package that corresponds to the type of Excel that is available on the device you are running bots on.

- No Excel installed: If you do not have Microsoft Excel installed on the device on which you are running bots to automate Excel-related processes, use the Excel basic package.
- Desktop Excel installed: If you have a desktop version of Microsoft Excel installed on your computer, use the Excel advanced package in your bots.
- Online Office 365 Excel only: If you are using Microsoft Excel 365 on a web browser, use the Office 365 Excel package for automating tasks related to Excel.

To learn more, search for the Automating Tasks Using A2019 Excel Commands course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

Before you start

Perform the following actions within the Excel basic package as part of using the set of available actions:

1. Open the Microsoft Excel spreadsheet that you want to read data from using the Open action.



Note: The Excel basic package supports files that are a maximum size of 30 MB.

You must associate the details of the file you want to use with a session name, and use the session name in the other actions in the Excel basic package, so that you do not have to provide the details of the file in those actions again. See [Using the Open action for Excel](#) on page 609.

2. Use the different actions available in the Excel basic package to automate the Microsoft Excel-related tasks.
3. After you have automated all the Microsoft Excel-related tasks, close the spreadsheet using the Close action.

Actions in the Excel basic package

The Excel basic package includes the following actions:

Action	Description
Switch to sheet	Switches to another sheet in a Microsoft Excel file. • Select the Sheet by Index (numerical value) or Sheet by Name option to specify how to activate the sheet. • Enter the name of the session used to open the workbook with the Open action.
Close	Closes the current workbook and provides an option to Save changes when closing the file. Enter the name of the session used to open the workbook with the Open action. Note: This action terminates the process for the session.

Action	Description
Delete cell	Deletes the Active cell or a Specific cell from the current worksheet or a CSV file. • Select the Shift cells left or Shift cells up option to specify whether to shift the cell one position to the left or up after the cell is deleted. • Select the Entire row or Entire column option to specify whether to delete the entire row or column of the cell. • Enter the name of the session used to open the workbook with the Open action.
Find	See Using Find action on page 620.
Get cell address	Retrieves the location of the active cell and stores it to a string variable. • Enter the name of the session used to open the workbook with the Open action. • In the Save the active cell address in local variable field, create or insert an existing string variable.
Get column name	Retrieves the letter value of the column of the active or specific cell and stores it to a string variable. • Select the Active cell or Specific cell option to specify whether to retrieve the column name from the active cell or a specific cell. • Enter the name of the session used to open the workbook with the Open action. • In the Save the column name into local variable field, create or insert an existing string variable.
Get multiple cells	Retrieves the values from cells in a Microsoft Excel spreadsheet and stores them in a table variable. This action retrieves cell values as string data types. It supports Excel cell formats, including Number, Percentage, Currency, Scientific, and Date. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable.  Note: You must convert the values to perform non-string operations. • Select the Multiple cells or All cells option to specify whether to retrieve the values from a range of cells or all the cells. • Enter the name of the session used to open the workbook with the Open action.

Action	Description
Get row number	Retrieves the row number of the active or specific cell and stores it to a string variable. • Select the Active cell or Specific cell option to specify whether to retrieve the row number from the active cell or a specific cell. • Enter the name of the session used to open the workbook with the Open action. • In the Save the row number into local variable field, create or insert an existing string variable.
Get single cell	Retrieves the values from a single cell in a Microsoft Excel spreadsheet or a CSV file and stores them in a string variable. This action retrieves cell values as string data types. It supports Excel cell formats, including Number, Percentage, Currency, Scientific, and Date. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable.  Note: You must convert the values to perform non-string operations. • Select the Active cell or Specific cell option to specify whether to retrieve the values from the active cell or a specific cell. • Enter the name of the session used to open the workbook with the Open action. • In the Store cell contents to field, create or insert an existing string variable. You can use the output value to Example of using a conditional statement on page 892.
Go to cell	Selects a specific cell in a Microsoft Excel spreadsheet or a CSV file. • Select the Active cell or Specific cell option to specify which cell to select. • Enter the name of the session used to open the workbook with the Open action.
Open	Reads data from a Microsoft Excel spreadsheet. See Using the Open action for Excel on page 609.  Note: This action does not open a Microsoft Excel spreadsheet. It only enables a task to read data from the spreadsheet.
Replace	See Using the Replace action on page 621.
Save workbook	Saves a Microsoft Excel spreadsheet to a specified location. Enter the name of the session used to open the workbook with the Open action.
Set cell	Sets the value you have specified in a cell in a Microsoft Excel spreadsheet. Select the Active cell or Specific cell option to specify whether to set the value in the active cell or a specific cell.

Action	Description
Set session variable	Assigns the session name to a variable. Use this action in a parent bot, and then insert the variable containing the session name in Excel-related actions in the child bot to associate the actions with the file opened in that session. When you run the bot, it passes the session variable to the child bot, which enables the child bot to process the data in the file opened in the parent bot.  Note: The parent and child bots must use actions from the same Excel package version to pass the session variable. Example of sharing an Excel session between bots on page 806
Switch to sheet	Activates a specific worksheet. - Select to activate the worksheet by the Index value or worksheet Name. The index is the numeric value assigned to the worksheet. - Enter the name of the session used to open the workbook with the Open action.

Excel advanced package

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

You can automate tasks related to the workbook, worksheet, rows, columns, and cell operations. You can use these actions when Microsoft Excel is installed on the device that you want to use to automate the Microsoft Excel-related tasks.

Actions in the Excel advanced package support Microsoft Office 2016 through Microsoft Office 2019 and .xls, .xlsx, .xlsb, and .xlsm formats. You can also use some of the actions with the .csv format. See [CSV operations](#) on page 626.

See [Example of migrating data from Excel to a database](#) on page 567.

Choosing the Excel package in Enterprise A2019

Enterprise A2019 includes packages to support three types of Microsoft Excel usage. For optimal results, use the package that corresponds to the type of Excel that is available on the device you are running bots on.

- No Excel installed: If you do not have Microsoft Excel installed on the device on which you are running bots to automate Excel-related processes, use the Excel basic package.
- Desktop Excel installed: If you have a desktop version of Microsoft Excel installed on your computer, use the Excel advanced package in your bots.
- Online Office 365 Excel only: If you are using Microsoft Excel 365 on a web browser, use the Office 365 Excel package for automating tasks related to Excel.

Before you start

Perform the following actions within the Excel advanced package as part of using the set of available actions:

1. Open the Microsoft Excel spreadsheet that you want to use to automate the Microsoft Excel-related tasks. Use the Open action to open the spreadsheet. See [Using the Open action for Excel](#) on page 609.



Note: For files containing large data sets, use actions from the Database package to automate create, read, and update operations. See [Using Connect action for database](#) on page 559.

2. Use the different actions available in the Excel advanced package to automate the Microsoft Excel-related tasks.
3. After you have automated all the Microsoft Excel-related tasks, close the spreadsheet using the Close action.

Actions in the Excel advanced package

The actions in the Excel advanced package enable you to perform the following operations:

Action	Description
Cell operations	Perform operations such as extracting data from cells, deleting values from a cell, moving a cursor to a specific cell, and finding and replacing content. See Cell operations on page 616.
Row and column operations	Perform operations such as inserting new rows and columns, and hiding and unhiding rows and columns. See Row and column operations on page 613.
Table operations	Perform operations such as sorting and filtering data in a table, inserting and deleting columns, and getting the table range. See Table operations on page 624.
Workbook operations	Perform operations such as opening a workbook, appending data, protecting and unprotecting a workbook, and converting a Microsoft Excel workbook to a PDF file. See Workbook operations on page 607.
Worksheet operations	Perform operations such as creating and deleting a worksheet, appending data, and hiding and unhiding a worksheet. See Worksheet operations on page 609.



Example tasks:

- [Example of transferring data from CSV file to Excel worksheet](#) on page 895
- [Example of using a conditional statement](#) on page 892

Watch the following video on how to use the Excel advanced package:

More resources

- Free Enterprise A2019 bot examples for Excel from Bot Store:
 - [A2019 - Merge Excel Sheets Example](#)
 - [A2019 - Convert XML to Excel](#)
 - [Convert multiple Excel files to CSV files](#)
- Tutorial on using A2019 Excel packages: [Work with large Excel datasets in a bot](#)
- Training course Automating Tasks Using A2019 Excel Commands - [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#)

Related tasks

[Using Find action](#) on page 620

Use the Find action to find a particular string in a Microsoft Excel spreadsheet or a CSV file.

Workbook operations

A workbook is a file that contains one or more worksheets. The Excel advanced package contains various actions that you can use to automate workbook-related tasks.

Workbook actions in the Excel advanced package

The Excel advanced package includes the following actions:

Action	Description
Append workbook	Adds all the worksheets from the specified workbook to the end of the currently open workbook. - Enter the name of the session used to open the workbook with the Open action. - Specify the workbook from which you want to append the worksheets in the Append from workbook field. - If the workbook is protected, select the Password is required check box and enter the password in the To open field.
Close	Closes the current workbook and provides an option to Save changes when closing the file. Enter the name of the session used to open the workbook with the Open action.
Convert excel to PDF	Converts the entire workbook, specific worksheets in a workbook, or a CSV file to a PDF file. - Enter the name of the session used to open the workbook with the Open action. - Specify whether you want to convert the Entire excel file, Active sheet, or Specific sheet to a PDF file. - Enter a name for the PDF file in the Select PDF file name field. - Specify the location where you want to save the file in the Select PDF storage location field.

Action	Description
Create workbook	Creates a Microsoft Excel workbook or a CSV file. - Enter the name of the session used to open the workbook with the Open action. - Specify the location where you want to save the workbook in the File path field. - Specify the name of the worksheet and passwords to open and edit the workbook.
Open	See Using the Open action for Excel on page 609.
Protect workbook	Protects the workbook and its structure using a password. Protecting a workbook prevents other users from opening the workbook without the password, and protecting the structure of a workbook prevents other users from adding, moving, deleting, hiding, and renaming worksheets within that workbook. - Enter the name of the session used to open the workbook with the Open action. - Select the Protect workbook and Protect workbook structure check boxes and provide a password in the respective fields.
Save workbook	Saves the current workbook. Enter the name of the session used to open the current workbook with the Open action.
Set session variable	Assigns the session name to a variable. Use this action in a parent bot, and then insert the variable containing the session name in Excel-related actions in the child bot to associate the actions with the file opened in that session. When you run the bot, it passes the session variable to the child bot, which enables the child bot to process the data in the file opened in the parent bot.  Note: The parent and child bots must use actions from the same Excel package version to pass the session variable. Example of sharing an Excel session between bots on page 806
Unprotect workbook	Unprotects a workbook and its structure. Unprotecting a workbook removes the restriction applied on opening the workbook, and unprotecting the structure of a workbook removes the restriction applied on modifying the structure of the workbook. Unprotecting allows other users to open the workbook, add, move, delete, hide, and rename worksheets within the workbook. - Enter the name of the session used to open the workbook with the Open action. - Select the Unprotect workbook and Unprotect workbook structure check boxes and provide a password to unprotect the workbook structure.

Using the Open action for Excel

Use the Open action to open a Microsoft Excel spreadsheet or a CSV file. This action enables you to specify whether to open the spreadsheet in read-only mode or read-write mode, a password to open the spreadsheet, and so on.

To open a Microsoft Excel spreadsheet, do the following:

1. Double-click or drag the Open action from the Excel node in the Actions palette.
2. Select from where you want to open the Microsoft Excel spreadsheet:



Note: The Excel basic package supports files that are a maximum size of 30 MB.

- Control Room file: Enables you to open a file from the Enterprise Control Room.
 - Desktop file: Enables you to open a file from the device. This field also accepts the file path input as a string variable or global value.
 - Variable: Enables you to open a file by specifying a file variable.
3. Select the Specific sheet name option and specify the name of the sheet to activate when the Microsoft Excel spreadsheet opens.
 4. Select Read-only mode or Read-write mode to open the Microsoft Excel spreadsheet in read-only or edit mode respectively.
 5. Select the Password is required check box if a password is required to open or edit the Microsoft Excel spreadsheet.
 6. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
 7. Select the Sheet contains a header check box if the Microsoft Excel spreadsheet contains a header row.
 8. Select the Load Add-ins check box if you want to load the add-ins available in the Microsoft Excel spreadsheet.
 9. Enter the name of the session used to open the workbook with the Open action.
 10. Click Save.

Worksheet operations

The Excel advanced package contains various actions that you can use to automate worksheet-related tasks.

Worksheet actions in the Excel advanced package

The Excel advanced package includes the following actions:

Action	Description
Access password protected worksheet	Accesses a password-protected worksheet in the current workbook. - Enter the name of the session used to open the workbook with the Open action. - Enter the password to access the worksheet.
Append worksheet	See Using Append worksheet action on page 612.

Action	Description
Create worksheet	Creates a worksheet in the current workbook. - Enter the name of the session used to open the workbook with the Open action. - Specify either an index number in the Sheet by Index field or a name in the Sheet by Name field for the worksheet. The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.
Delete worksheet	Deletes a spreadsheet from the current workbook. - Enter the name of the session used to open the workbook with the Open action. - Specify either an index number in the Sheet by Index field or a name in the Sheet by Name field for the worksheet. The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.  Note: You can delete a worksheet only if the workbook contains more than one worksheet.
Get current worksheet name	Gets the name of the current worksheet and assigns it to a string variable. - Enter the name of the session used to open the workbook with the Open action. - Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.
Get worksheet as data table	Gets data from a worksheet and saves it in a table variable. - Specify either an index number in the Sheet by Index field or a name in the Sheet by Name field for the worksheet. The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field. - Choose from the Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%.  Recommendation: Use option Read cell value as reading value from a cell gives better performance than reading a visible text. - Enter the name of the session used to open the workbook with the Open action. - Select a table variable that you want to use to store the data from the worksheet from the Assign value to the variable list.

Action	Description
Get worksheet names	Gets the names of all the worksheets and assigns them to a list variable of string data type. - Enter the name of the session used to open the workbook with the Open action. - Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.
Hide worksheet	Hides a worksheet from the current workbook. - Specify the name of the worksheet to hide in the Enter worksheet name to hide field.  <u>Note: You can hide a worksheet only if the workbook contains more than one worksheet.</u> - Enter the name of the session used to open the workbook with the Open action.
Password protect worksheet	Protects a worksheet with a password. You can also specify the operations to restrict on the worksheet. - Specify the password you want to use to protect the worksheet and select the check boxes for the operation that you want to restrict on the worksheet. For example, select the Delete row and Delete column check boxes to restrict a user from deleting a row or column from the worksheet. - Enter the name of the session used to open the workbook with the Open action.
Rename worksheet	Renames a worksheet in the current workbook. - Specify the index number or name of the worksheet to rename in the Sheet by Index or Sheet by Name field. The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.  <u>Note: You cannot rename the worksheet if a worksheet with the same name already exists in the workbook.</u> - Enter the new worksheet name that is under 31 characters. - Enter the name of the session used to open the workbook with the Open action.

Action	Description
Retrieve sheets count	Gets the number of sheets available in the current workbook and stores it in a number variable. • Select the appropriate option to specify whether to include the hidden worksheet or not and assign the count to a variable. • Enter the name of the session used to open the workbook with the Open action. • Select a number variable that you want to use to store the name of the worksheet from the Select the variable to assign to list.
Run macro	Runs a macro in a worksheet. • Specify the name of the macro you want to run and its arguments. • Enter the name of the session used to open the workbook with the Open action.
Switch to sheet	Activates a particular sheet in a Microsoft Excel file. • Enter the name of the session used to open the workbook with the Open action. • Specify whether to activate the Sheet by Index (numerical value) or Sheet by Name.
Unhide all worksheets	Unhides all worksheets in the current workbook. Enter the name of the session used to open the current workbook with the Open action.
Unhide worksheet	Unhides a specific worksheet in the current workbook. • Enter the name of the worksheet you want to unhide. • Enter the name of the session used to open the workbook with the Open action.
Write from data table	Write values from a data table into a worksheet. • Specify the data table variable that contains the data you want to write in a worksheet. • Specify whether you want to write data in the currently Active worksheet or Specific worksheet. • Specify the address of the cell that you want to use as the starting point of the data in the Specify the first cell field. • Enter the name of the session used to open the workbook with the Open action.

Using Append worksheet action

Use the Append worksheet action to append a worksheet from another workbook to the current workbook.



Note: If the current workbook already has a worksheet with the same name, you must rename the worksheet being appended.

To append a worksheet, do the following:

1. Double-click or drag the Append worksheet action from the Excel node in the Actions palette.

2. Select an option to specify the location of the spreadsheet from which you want to append the worksheet:
 - From 'My bots': Enables you to open a Microsoft Excel spreadsheet from an existing bot.
 - From local device: Enables you to open a Microsoft Excel spreadsheet from a local device.
 - Select an existing file variable: Enables you to open a Microsoft Excel spreadsheet using a file variable.
3. Select the Password is required option if the Microsoft Excel spreadsheet requires a password to open it.
4. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
5. Select the Enter worksheet name or Enter worksheet index option to specify the name or number of the worksheet that you want to append.
6. Enter the name of the session used to open the workbook with the Open action.
7. Click Save.

Row and column operations

The Excel advanced package contains various actions that you can use to automate tasks related to the row and column operations in a Microsoft Excel spreadsheet.

Row and column actions in the Excel advanced package

The Excel advanced package includes the following actions:

Action	Description
Get column name	Retrieves the column name that contains the specific cell and stores it to a string variable. This action supports .xlsx and .xlsm files. • Select the Active cell or Specific cell option to specify the cell location. • Enter the name of the session used to open the workbook with the Open action. • Select a string variable from the Save the column name to variable list.
Get row number	Retrieves the row number that contains the specific cell and stores it to a string variable. This action supports .xlsx and .xlsm files. • Select the Active cell or Specific cell option to specify the cell location. • Enter the name of the session used to open the workbook with the Open action. • Select a string variable from the Save the row number to variable list.

Action	Description
Hide rows/columns in selection	Hides rows or columns in the current worksheet. - Select the appropriate option to specify whether to hide one or more rows and columns. - Enter the name of the session used to open the workbook with the Open action.
Insert/Delete Rows/Columns	See Using Insert or Delete actions for rows and columns on page 615.
Read column	Extracts data from a column and stores it in a list variable of string data type. - Select the From active cell or From specific cell option to specify the starting point. You can also select the Read full column option to extract data for the entire column. - Choose from the Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%. ➔ Recommendation: Use the Read cell value option as reading value from a cell for better performance than reading visible text. - Enter the name of the session used to open the workbook with the Open action. - Select a list variable of string data type that you want to use to store the extracted values.
Read row	Extracts data from a row and stores it in a list variable of string data type. - Select the From active cell or From specific cell option to specify the starting point. You can also select the Read full row option to extract data for the entire row. - Choose from the Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%. ➔ Recommendation: Use option Read cell value as reading value from a cell gives better performance than reading a visible text. - Enter the name of the session used to open the workbook with the Open action. - Select a list variable of string data type that you want to use to store the extracted values.
Remove blank rows	Removes blank rows from the current worksheet. You can specify the range from which you want to delete the blank rows.

Action	Description
Select cell(s)/row(s)/column(s)	See Using Select action for cells, rows, and columns on page 615.
Unhides rows/columns in selection	Unhides the hidden rows or columns in the current worksheet. - Select the appropriate option to specify whether you want to unhide a row or column and which row or column to unhide. - Enter the name of the session used to open the workbook with the Open action.

Using Insert or Delete actions for rows and columns

Use the Insert or Delete actions to create or remove rows or columns from the current worksheet or CSV file.

To insert or delete rows or columns in a worksheet, do the following:

- Double-click or drag the Insert or Delete action from the Excel node in the Actions palette.
- Select the Row operations if you want to insert or delete rows from the spreadsheet.
 - Select the Insert Row at option to insert a row and specify the location where you want to insert the row in the field.
 - Select the Delete Row(s) at option to delete rows. You must specify the row number you want to delete in the field. For example, if you want to delete the tenth row in the worksheet, you must enter 10 in the field. If you want to delete the first five rows, you must enter 1 : 5 in the field.
- Select the Column operations if you want to insert or delete columns from the spreadsheet.
 - Select the Insert Column at option to insert a column and specify the location where you want to insert the column in the field.
 - Select the Delete Column(s) at option to delete columns. You must specify the address of the column you want to delete in the field. For example, if you want to delete column 'D' in the worksheet, you must enter D in the field. If you want to delete the first five columns, you must enter A : E in the field.
- Enter the name of the session used to open the workbook with the Open action.
- Click Save.

Using Select action for cells, rows, and columns

Use the Select action to select cells, rows, or columns.

To select cells, rows, or columns do the following:

- Double-click or drag the Select cell, row, or column action from the Excel node in the Actions palette.
- Select an option from the Select list to specify whether you want to select a cell, row, or column.
 - If you have selected the Cell option, select any of the following options:
 - Active cell: Enables you to select the active cell from the worksheet.
 - Specific cell: Enables you to select the cell you have specified in the field.
 - Cell range: Enables you to select all the cells in the range you have specified in the field.
 - All cells in the sheet: Enables you to select all the cells in the worksheet.
 - If you have selected the Column option, select any of the following options:

- Column of active cell: Selects the column of the current active cell in the worksheet.
 - Specific column: Enables you to select the column you have specified in the field.
 - Column range: Enables you to select all the columns in the range you have specified in the field.
- c) If you have selected the Row option, select any of the following options:
- Row of active cell: Selects the row of the current active cell in the worksheet.
 - Specific row: Enables you to select the row you have specified in the field.
 - Row range: Enables you to select all the rows in the range you have specified in the field.
3. Enter the name of the session used to open the workbook with the Open action.
 4. Click Save.

Cell operations

The Excel advanced package contains various actions that you can use to automate tasks related to cell operations.

Cell actions in the Excel advanced package

The Excel advanced package includes the following actions:

Action	Description
Delete cells	Deletes the Active cell or a Specific cell from the current worksheet or a CSV file.  Note: You can enter a cell range in the Specific - cell field using the <code>starting - cell:ending cell</code> format. For example, to perform this operation on all cells in the second row and from the first through third column, enter <code>A2:C2</code>. After deleting the cell, you can: • Shift cells left: Deletes the specified cell and shifts the cell one position to the left. • Shift cells up: Deletes the specified cell and shifts the cell one position up. • Entire row: Deletes the entire row that contains the cell you have specified to delete. • Entire column: Deletes the entire column that contains the cell you have specified to delete.
Find next empty cell	See Using Find next empty cell action on page 621.
Find	See Using Find action on page 620.
Get cell address	Retrieves the location of the active cell and stores it to a string variable. This action supports .xlsx and .xlsm files. See Using the Get cell address action on page 622
Get cell color	See Using Get cell color action on page 622.

Action	Description
Get multiple cells	Retrieves the values from the cells in a Microsoft Excel spreadsheet and stores them in a table variable. This action retrieves cell values as string data types. It supports Excel cell formats, including Number, Percentage, Currency, Scientific, and Date. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable.  Note: You must convert the values to perform non-string operations. • Select the Multiple cells option to retrieve values from a range of cells, or select All cells to retrieve values from all the cells. • Choose from the Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%.  Recommendation: Use the Read cell value option as the reading value for a better performance than reading visible text. • Enter the name of the session used to open the workbook with the Open action. • Select a table variable to store the retrieved values in the Assign value to variable list.
Get number of rows	See Using Get number of rows action on page 623.

Action	Description
Get single cell	Retrieves the values from a single cell in a Microsoft Excel spreadsheet or a CSV file and stores them in a string variable. This action retrieves cell values as string data types. It supports Excel cell formats, including Number, Percentage, Currency, Scientific, and Date. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable.  Note: You must convert the values to perform non-string operations. • Select the Active cell option to retrieve the value from the active cell, or select Specific cell to retrieve the value from a specific cell in a Microsoft Excel spreadsheet. • Choose from the Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%.  Recommendation: Use the Read cell value option as the reading value from a cell for a better performance than reading visible text. • Enter the name of the session used to open the workbook with the Open action. • Select a string variable to store the retrieved values in the Store cell contents to list. Example of using a conditional statement on page 892.
Go to cell	Moves the cursor to a specific cell in a Microsoft Excel spreadsheet or a CSV file. • Select the Specific cell option to specify the cell to which the cursor should be moved, or select an option from the Active cell list.  Note: You can enter a cell range in the Specific cell field to select the entire range of cells. For example, to select all the cells in the second row and from the first through third column, enter A2 : C2. • Enter the name of the session used to open the workbook with the Open action.

Action	Description
Go to next empty cell	Finds the next empty cell in the current worksheet. You can specify whether to find the empty cell toward the left, right, up, or down. • Select the Active cell or Specified cell option to specify the cell from which to start searching for the empty cell. If you have selected the Specified cell option, specify the address of the cell in the field. • Select the left, right, up, or down option to specify the direction in which to search for the next empty cell. • Enter the name of the session used to open the workbook with the Open action.
Read cell formula	Gets the formula available in the Active cell or Specified cell and assigns the output to a string variable. This action returns a blank value if the specified cell does not contain a formula. • Enter the name of the session used to open the workbook with the Open action. • Select the Active cell or Specified cell option to specify the cell from which to read the formula. If you have selected the Specified cell option, specify the address of the cell in the field. • Select a string variable to store the name of the formula from the Assign the output to variable list.
Replace	See Using the Replace action on page 621.
Set cell	Sets a value in the Active cell or Specific cell in a Microsoft Excel spreadsheet or a CSV file. You can also use this action to set a formula. • Select the Active cell or Specified cell option to specify the cell in which to set the value. If you have selected the Specified cell option, specify the address of the cell in the field.  Note: You can enter a cell range in the Specific cell field to set a particular value in all the cells of the range. For example, to set a value of 5 on all cells in the second row and from the first through third column, enter A2:C2. • Enter the value to set in the Cell value field. • Enter the name of the session used to open the workbook with the Open action.

Action	Description
Set cell formula	Sets a formula in the active cell or a specific cell in a Microsoft Excel spreadsheet or a CSV file. To generate a random number, use the Number > Random action. See Random action. • Select the Set formula for active cell or Set formula for specified cell option to specify the cell in which to set the formula. If you have selected the Set formula for specified cell option, specify the address of the cell in the field. • Enter the formula to set in the Enter formula for specific cell field. • Enter the name of the session used to open the workbook with the Open action.

Using Find action

Use the Find action to find a particular string in a Microsoft Excel spreadsheet or a CSV file.

To find a value in a Microsoft Excel spreadsheet, do the following:

1. Double-click or drag the Find action from the Excel node in the Actions palette.
2. Select an option from the From list to specify a starting point of the cell range for search:
 - Beginning: Starts the search from the beginning of the spreadsheet.
 - End: Starts the search from the end of the spreadsheet.
 - Active cell: Starts the search from the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell from where you want to start the search.
3. Select an option from the Till list to specify an end point of the cell range for search:
 - Beginning: Ends the search at the beginning of the spreadsheet.
 - End: Ends the search at the end of the spreadsheet.
 - Active cell: Ends the search at the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell where you want to end the search.
4. Specify the string you want to search for in the Find field.
5. Select from the following search options:
 - By rows: Enables you to search by rows.
 - By columns: Enables you to search by columns.
 - Match by case: Only performs this action on cells that contain a string that matches the uppercase and lowercase characters of the string you specified in the Find field.
 - Match entire cell contents: Enables you to find only those cells that contain the entire string you have specified in the Find field.
6. Select the list variable of string data type that you want to use to store the output from the Assign cell addresses variable list.
7. Enter the name of the session used to open the workbook with the Open action.
8. In the Assign value to variable list, select a string variable.
9. Click Save.

Using the Replace action

Use the Replace action to find cells that contain a specific string and replace it with another string. This action supports .xlsx, .xlsm, and .csv files.

1. Double-click or drag the Replace action from the Excel advanced node in the Actions palette.
2. Select an option from the From list to specify a starting point of the cell range for search:
 - Beginning: Starts the search from the beginning of the spreadsheet.
 - End: Starts the search from the end of the spreadsheet.
 - Active cell: Starts the search from the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell from where you want to start the search.
3. Select an option from the Till list to specify an end point of the cell range for search:
 - Beginning: Ends the search at the beginning of the spreadsheet.
 - End: Ends the search at the end of the spreadsheet.
 - Active cell: Ends the search at the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell where you want to end the search.
4. Specify the string you want to search for in the Find field.
5. Select from the following search options:
 - By rows: Enables you to search by rows.
 - By columns: Enables you to search by columns.
 - Match by case: Only performs this action on cells that contain a string that matches the uppercase and lowercase characters of the string you specified in the Find field.
 - Match entire cell contents: Enables you to find only those cells that contain the entire string you have specified in the Find field.
6. Select Replace with and specify the replacement string.
7. Select Replace with and specify the replacement string, or leave the field blank to replace the matching cells with an empty character.
8. Enter the name of the session used to open the workbook with the Open action.
9. Click Save.

Using Find next empty cell action

Use the Find next empty cell action to find the next empty cell in the current worksheet.

To find the next empty cell, do the following:

1. Double-click or drag the Find next empty cell action from the Excel node in the Actions palette.
2. Select the row or column option from the Traverse by section to specify whether you want to find the empty cell in a row or column.
3. Select the active cell or specific cell option from the Start from section to specify the point from where you want to start the search.
4. Select the string variable you want to use to store the address of the empty cell from the Assign the output to variable list.
5. Enter the name of the session used to open the workbook with the Open action.
6. Click Save.

Using Get cell color action

Use the Get cell color action to get the color of the background or text in a cell. This action retrieves the color of a cell as RGB values. For example, if the background or text in a cell is of red color, the value retrieved is 255,0,0.

To get the color of the background or text in a cell, do the following:

1. Double-click or drag the Get cell color action from the Excel node in the Actions palette.
2. Select the Background color option to get the background color of the cell or the Text color option to get the color of the text.
3. Select the Active cell option to get the color from the current active cell or the Specific cell option to get the color from the address of the cell you have specified.
4. Select a variable from the Assign the output to variable list to assign the address of the empty cell to the variable you have selected from the list.
5. Select the string variable you want to use to store the address of the empty cell from the Assign the output to variable list.
6. Enter the name of the session used to open the workbook with the Open action.
7. Click Save.

Using the Get cell address action

Use the Get cell address action to retrieve the location of the active cell and store it to a string variable. This action supports .xlsx and .xlsm files.

Open a worksheet using the Open action. You must select the Contains header option when configuring the Open action in order to use this action to retrieve the cell address based on the column title name.

1. Double-click or drag the Get cell address action from the Excel advanced node in the Actions palette.
2. Select whether to retrieve the cell address from the Active cell or Based on header:

Option	Steps
Active cell	If you select this option, the bot will retrieve the cell address of the currently active cell. Skip to Step 5.

Option	Steps
Based on header	If you select this option, the bot will retrieve the cell address of the cell specified by the column title name and cell position. Complete the following fields: - Enter the column title: If you selected the Sheet contains header option when you opened this sheet using the Open action, enter the column name. For example, <code>First Name</code>. If you did not select that option, enter the default column name. For example, <code>A</code>.  <u>Note: This field is not case-sensitive.</u> - Enter cell position from column title: Enter the number of cells between the header cell and the cell from which you want to retrieve the address. Enter up to three digits. For example, if the header cell is located at B1 and you specify 2 as the cell position, the action will return B3.

3. Select whether to retrieve the cell address from the Active cell or a Specific cell.

- If you have selected the Active cell option, the bot will retrieve the cell address of the currently active cell. Skip to Step 5.
- If you have selected the Specific cell option, the bot will retrieve the cell address of the cell specified by the column title name and cell position. Complete the following fields:

- Enter the column title: Enter the column name. For example, `Name`.



Note: This field is not case-sensitive.

- Enter cell position from column title: Enter the number of cells between the header cell and the cell from which you want to retrieve the address. Enter up to three digits.

For example, if the header cell is located at B1 and you specify 2 as the cell position, the action will return B3.

- In the Save active or user specified cell address in local variable field, create or insert an existing string variable.
- Enter the name of the session used to open the workbook with the Open action.
- Click Save.

Next, you can insert the string variable containing the cell address into the Specific cell field of actions related to cell operations. See [Cell operations](#) on page 616.

Using Get number of rows action

Use the Get number of rows action to get the number of rows that contain data.

To get the number of rows that are not empty or contain data, do the following:

- Double-click or drag the Get number of rows action from the Excel node in the Actions palette.

2. Select the Index option to specify the number of the worksheet or the Name option to specify the name of the worksheet from which you want to get the number or rows.
3. Select the Non-empty rows option to get the number of rows that are not empty or the Total rows with data option to get the number of rows that contain data.
4. Enter the name of the session used to open the workbook with the Open action.
5. Select the number variable you want to use to store the output from the Assign to variable list.
6. Click Save.

Table operations

The Excel advanced package contains various actions that you can use to automate tasks related to table operations in a Microsoft Excel spreadsheet.

Table actions in the Excel advanced package



Note: Ensure that a table is available in the workbook. A worksheet that contains data in various rows and columns is not considered as a table.

The Excel advanced package includes the following actions:

Action	Description
Delete table column	Deletes a column in a table. - Specify the Table name from which you want to delete a column. Note: The table name is a string value. It is NOT a data table name. For information on how to retrieve the Excel table name, see Rename an Excel table. - Select the Name or Position to specify the name or position of the column to delete. - Enter the name of the session used to open the workbook with the Open action.
Filter table	See Using Filter table action on page 625.
Get table range	Gets the range of a table available in a worksheet and stores the output in a string variable. - Specify the Table name for which you want to get the range. Note: The table name is a string value. It is NOT a data table name. For information on how to retrieve the Excel table name, see Rename an Excel table. - Select the options to specify whether you want to include a header and pivot table in the range and a variable to store the output. - Enter the name of the session used to open the workbook with the Open action.

Action	Description
Insert table column	Inserts a column in a table. - Specify the Table name in which you want to insert a column.  Note: The table name is a string value. It is NOT a data table name. For information on how to retrieve the Excel table name, see Rename an Excel table. - Specify the name of the column in the Column name field and the position where you want to insert the column in the Column position field. - Enter the name of the session used to open the workbook with the Open action.
Sort table	Sorts the data in a column of a table. This action enables you to sort numeric and text data. - Specify the Table name for which you want to sort the data.  Note: The table name is a string value. It is NOT a data table name. For information on how to retrieve the Excel table name, see Rename an Excel table. - Select the Column name or Column position to specify the name or position of the column. - Select an appropriate option from the Number or Text list to specify the sort order. - Enter the name of the session used to open the workbook with the Open action.

Using Filter table action

Use the Filter table action to filter data from a column in a table.

To filter data in a table, do the following:

- Double-click or drag the Filter table action from the Excel node in the Actions palette.
- Specify the name of the table from which you want to filter data in the Table name field.



Note: The table name is a string value. It is NOT a data table name. For information on how to retrieve the Excel table name, see [Rename an Excel table](#).

- Select the Column name to specify the name of the column or the Column position to specify the position of the column that contains the data you want to filter.
- Select the Number option if the column you have specified contains number data.

- Select an option from the list to specify the operator you want to use to filter the data.

The following options are available:

- Equals: Filters the data that is equal to the value you have specified.
- Does not equal: Filters the data that is not equal to the value you have specified.
- Greater than: Filters the data that is greater than the value you have specified.
- Greater than or equal to: Filters the data that is greater than or equal to the value you have specified.
- Less than: Filters the data that is less than the value you have specified.

- Less than or equal to: Filters the data that is less than or equal to the value you have specified.
- Between: Filters the data that is between the two values you have specified.



Note: Apart from the Between option, you do not have to provide a value in the second field. If you have provided a value in the second field, the system ignores that value when filtering the data.

5. Select the Text option if the column you have specified contains textual data.
 - a) Select an option from the list to specify the operator you want to use to filter the data.
The following options are available:
 - Equals: Filters the data that is equal to the value you have specified.
 - Does not equal: Filters the data that is not equal to the value you have specified.
 - Begins with: Filters the data that begins with the value you have specified.
 - Ends with: Filters the data that ends with the value you have specified.
 - Contains: Filters the data that contains the value you have specified.
 - Does not contain: Filters the data that does not contain the value you have specified.
6. Enter the name of the session used to open the workbook with the Open action.
7. Click Save.

CSV operations

You can use some of the actions available in the Excel advanced package to perform various operations on a CSV file.

CSV actions in the Excel advanced package

The following table lists the actions that you can use with a CSV file:

Supported	Not Supported
Open	Find next empty cell
Set cell	Get cell colour
Go to cell	Go to next empty cell
Insert/Delete row column	Run macro
Insert/Delete row column	Unhide all worksheets
Get cell	Hide row/column in selection
Find/Replace	Unhide row/column in selection
Convert excel to pdf	Access password protected worksheet
Delete cells	Protect/Unprotect workbook
Set cell formula	Table related commands
Create workbook	Create worksheet

You can use the Loop action to retrieve data from each row in a CSV file. You can also use any of the above action that supports the use of a CSV file within a Loop action.



Note: All the other actions available in the Excel advanced package that are not listed in the above table cannot be used with a CSV file.

File package

The File package contains actions that enable you to automate various file-related operations such as creating, opening, copying, deleting, and renaming a file.

Use the actions available in the File package either individually to perform an action one time or in a Loop action to perform that action for each file available in a folder.

Actions in the File package



Note: You can use the Zip action available in the Folder package to compress a file. See [Using the Zip action](#) on page 637.

The File package includes the following actions:

Action	Description
Assign	Assigns a file from the Enterprise Control Room, Desktop, or an existing File variable to a user-defined File variable.
Copy	See Using Copy action for file on page 628.
Create	Creates a new file. - In the File field, specify the name including the location to store the file. - In the Overwrite an existing file option, select an existing file with the same name to overwrite it. If existing files are not overwritten, the Enterprise Control Room appends the name of the new file with a numeric value.
Create shortcut	Creates a shortcut to the specific file at the user-specified file path. The shortcut is dependent on the source file. If you make changes to the source file, they will also apply to the shortcut. - In the Source folder field, specify the name and location. - In the Destination folder field, specify the name and location.
Delete	See Using Delete action for file on page 629.

Action	Description
Download CR file	Downloads a file from the Enterprise Control Room to a specified location on the device.  Note: You cannot use this action to download a bot or a file from the My Scripts folder. - In the Select a Control Room file field, specify the file to download. - In the Save CR file to location field, specify the path where you want to save the file. You can insert a variable that holds the entire file path, or part of the file path. For example, C:\user\My Docs\test.csv or C:\user\My Docs\\${fileName\$}  Note: If the folder structure does not already exist, the bot creates the folders as needed. - Select True or False, or insert a Boolean variable to specify whether to overwrite the existing file.
Open	Opens an existing file. In the File field, specify the name including the location to store the file.
Print	See Using Print action for file on page 631.
Print multiple files	See Using Print multiple files action on page 632.
Rename	See Using Rename action for file on page 630.

Related reference

[If package](#) on page 656

Use the actions in the If package to control the sequence of execution based on one or more conditions of a task.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[Variables overview](#) on page 866

Enterprise A2019 offers a variety of variables, each designed to hold specific types of data and is intended for specific use. Use the topics below to learn more about each variable and how to use them.

Using Copy action for file

Use the Copy action to copy an existing file. This action enables you to copy a file based on its size and the date it was created or modified.

To copy an existing file, follow these steps:

- In the Actions palette, double-click or drag the Copy action from the File package.
- From the Source file field select one of the following options:
 - Specific: Specify the name and location of the file.
 - For Regex: Specify the source folder path.

You can use a regular expression (regex) in your source file or folder path to support a pattern-based search. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value.

For example, if want to copy, delete, rename or print multiple files from your source folder using pattern based search, use regular expressions either as a String and enter the value as `My_` for all file name starting with `My_` or as a Pattern such as `[a-z]{3}(.txt|xlsx)` to retrieve files that matches this pattern.

3. In the Destination file/folder field, specify the name of the file and location.
4. Select the Overwrite existing files check box to overwrite an existing file with the same name at the specified location.
If this option is not selected, the system appends the name of the copied file with a numeric value. For example, if you have copied a file named `June_Quarter_report.pdf` and a file with the same name exists in the location where you want to save the copied file, the system saves the copied file as `June_Quarter_report_(1).pdf`. The numeric value is incremented each time you copy a file with the same name when the overwrite check box is not selected.
5. Select the Size check box to copy a file based on its size.
 - a) Select any of the following options from the list:
 - Atleast: Copies a file only if the file size is more than the size you have specified.
 - Atmost: Copies a file only if the file size is less than the size you have specified.
 - Exact: Copies a file only if the file size is the same as the size you have specified.
 - b) Specify a value in the Size field.
6. Select the Date check box to copy a file based on the date it was created or modified.
 - a) Select any of the following options from the list:
 - Created: Enables you to copy a file based on the date it was created.
 - Modified: Enables you to copy a file based on the date it was modified.
 - b) Select the Is within last option and specify a value in the field.
This option enables you to perform the operation on the file if it was created or modified within the number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the file if it was created or modified in the last 7 days.
 - c) Select the Is between option to specify a period.
This option enables you to specify a Start date and an End date for the period. For example, if you specify 01/01/19 as the start date and 01/31/19 as the end date of the period, the system performs the operation on the file if it was created or modified between this period.

 Note: The Start date and End date are included in the period.

 - d) Select the Is before option and specify a value in the field.
This option enables you to perform the operation on the file if it was created or modified on or before the date you have specified.

7. Click Save.

Using Delete action for file

Use the Delete action to delete a file. This action enables you to delete a file based on its size and the date it was created or modified.

Follow these steps to delete a file:

1. In the Actions palette, double-click or drag the Delete action from the File package.
2. From the Source file field select one of the following options:

- Specific: Specify the name and location of the file.
- For Regex: Specify the source folder path.

You can use a regular expression (regex) in your source file or folder path to support a pattern-based search. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value.

For example, if want to copy, delete, rename or print multiple files from your source folder using pattern based search, use regular expressions either as a String and enter the value as `My_` for all file name starting with `My_` or as a Pattern such as `[a-z]{3}(.txt|xlsx)` to retrieve files that matches this pattern.

- Select the Size check box to delete a file based on its size.
 - Select any of the following options from the list:
 - Atleast: Deletes a file only if the file size is more than the size you have specified.
 - Atmost: Deletes a file only if the file size is less than the size you have specified.
 - Exact: Deletes a file only if the file size is the same as the size you have specified.
 - Specify a value in the Size field.
- Select the Date check box to delete a file based on the date it was created or modified.
 - Select any of the following options from the list:
 - Created: Enables you to delete a file based on the date it was created.
 - Modified: Enables you to delete a file based on the date it was modified.
 - Select the Is within last option and specify a value in the field.

This option enables you to perform the operation on the file if it was created or modified within the number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the file if it was created or modified in the last 7 days.
 - Select the Is between option to specify a period.

This option enables you to specify a Start date and an End date for the period. For example, if you specify 01/01/19 as the start date and 01/31/19 as the end date of the period, the system performs the operation on the file if it was created or modified between this period.

Note: The Start date and End date are included in the period.

 - Select the Is before option and specify a value in the field.

This option enables you to perform the operation on the file if it was created or modified on or before the date you have specified.
- Click Save.

Using Rename action for file

Use the Rename action to rename a file. This action enables you to rename a file based on its size and the date it was created or modified.

To rename a file, follow these steps:

- In the Actions palette, double-click or drag the Rename action from the File package.
- From the Source file field select one of the following options:
 - Specific: Specify the name and location of the file.
 - For Regex: Specify the source folder path.

You can use a regular expression (regex) in your source file or folder path to support a pattern-based search. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value.

For example, if want to copy, delete, rename or print multiple files from your source folder using pattern based search, use regular expressions either as a String and enter the value as `My_` for all file name starting with `My_` or as a Pattern such as `[a-z]{3}(.txt|xlsx)` to retrieve files that matches this pattern.

3. In the New file name field, specify a new name for the file.
4. Select the Size check box to rename a file based on its size.
 - a) Select any of the following options from the list:
 - Atleast: Renames a file only if the file size is more than the size you have specified.
 - Atmost: Renames a file only if the file size is less than the size you have specified.
 - Exact: Renames a file only if the file size is the same as the size you have specified.
 - b) Specify a value in the Size field.
5. Select the Date check box to rename a file based on the date it was created or modified.
 - a) Select any of the following options from the list:
 - Created: Enables you to rename a file based on the date it was created.
 - Modified: Enables you to rename a file based on the date it was modified.
 - b) Select the Is within last option and specify a value in the field.
 This option enables you to perform the operation on the file if it was created or modified within the number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the file if it was created or modified in the last 7 days.
 - c) Select the Is between option to specify a period.
 This option enables you to specify a Start date and an End date for the period. For example, if you specify 01/01/19 as the start date and 01/31/19 as the end date of the period, the system performs the operation on the file if it was created or modified between this period.

 Note: The Start date and End date are included in the period.
 - d) Select the Is before option and specify a value in the field.
 This option enables you to perform the operation on the file if it was created or modified on or before the date you have specified.
6. Click Save.

Using Print action for file

Use the Print action to print a file. This action enables you to print a file based on its size and the date it was created or modified.

Follow these steps to print a file:

1. In the Actions palette, double-click or drag the Print action from the File package.
2. In the File field, specify the name and location of the file.
3. Select the Size check box to print a file based on its size.
 - a) Select any of the following options from the list:
 - Atleast: Prints a file only if the file size is more than the size you have specified.

- Atmost: Prints a file only if the file size is less than the size you have specified.
 - Exact: Prints a file only if the file size is the same as the size you have specified.
- b) Specify a value in the Size field.
4. Select the Date check box to print a file based on the date it was created or modified.
- a) Select any of the following options from the list:
- Created: Enables you to print a file based on the date it was created.
 - Modified: Enables you to print a file based on the date it was modified.
- b) Select the Is within last option and specify a value in the field.
- This option enables you to perform the operation on the file if it was created or modified within the number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the file if it was created or modified in the last 7 days.
- c) Select the Is between option to specify a period.
- This option enables you to specify a Start date and an End date for the period. For example, if you specify 01/01/19 as the start date and 01/31/19 as the end date of the period, the system performs the operation on the file if it was created or modified between this period.
-
-  Note: The Start date and End date are included in the period.
-
- d) Select the Is before option and specify a value in the field.
- This option enables you to perform the operation on the file if it was created or modified on or before the date you have specified.
5. Click Save.

Using Print multiple files action

Use Print multiple files to print multiple files based on the size and the date they were created or modified.

Follow these steps to print multiple files:

1. In the Actions palette, double-click or drag the Print multiple files action from the File package.
2. In the Folder field, specify the name and location of the folder.
3. From the File type field, select String to specify the file type of your files or Regex

Use the regular expression in your source file or folder path to support pattern based search. Select the regular expression (Regex) either as a String or Pattern for each regex condition and input the regex value.

For example, you can use regular expressions either as a String and enter the value as `My_` for all file name starting with `My_` or as a Pattern such as `[a-z]{3}(.txt|xlsx)` to retrieve files that matches this pattern.
4. Select the Include subfolders check box to include all the subfolders in your selected folder.
5. Select the Size check box to print multiple files based on their size.

a) Select any of the following options from the list:

 - Atleast: Prints multiple files only if the file size is more than the size you have specified.
 - Atmost: Prints multiple files only if the file size is less than the size you have specified.
 - Exact: Prints multiple files only if the file size is the same as the size you have specified.

- b) Specify a value in the Size field.
6. Select the Date check box to print multiple files based on the date they were created or modified.
- a) Select any of the following options from the list:
- Created: Enables you to print multiple files based on the date they were created.
 - Modified: Enables you to print multiple files based on the date they were modified.
- b) Select the Is within last option and specify a value in the field.
This option enables you to perform the operation on the files if they were created or modified within the number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the files if they were created or modified in the last 7 days.
- c) Select the Is between option to specify a period.
This option enables you to specify a Start date and an End date for the period. For example, if you specify 01/01/19 as the start date and 01/31/19 as the end date of the period, the system performs the operation on the files if they were created or modified between this period.
-
-  Note: The Start date and End date are included in the period.
-
- d) Select the Is before option and specify a value in the field.
This option enables you to perform the operation on the files if they were created or modified on or before the date you have specified.
7. Click Save.

Folder package

The Folder package contains actions that enable you to automate folder-related operations.

Actions in the Folder package

The Folder package includes the following actions:

Action	Description
Copy	See Using Copy action on page 634.
Create	Creates a new folder. - In the Folder field, specify the name and location.  Note: Folder names cannot include system actions or device references such as AUX, CON, LPT, NUL, and PRN. - Select the Overwrite an existing folder check box to overwrite an existing folder.  Note: If this option is not selected, the system appends the name of the new folder with a numeric value.

Action	Description
Create shortcut	Creates a shortcut to the specific folder at the user-specified file path. The shortcut is dependent on the source folder. If you make changes to the source folder, they will also apply to the shortcut. - In the Source folder field, specify the name and location. - In the Destination folder field, specify the name and location.
Delete	See Using Delete action on page 635.
Open	Opens a folder at a specific location. In the Folder field, specify the name and location.
Rename	See Using Rename action on page 636.
Unzip	See Using Unzip action on page 636.
Zip	See Using the Zip action on page 637.

Using Copy action

Use the Copy action to copy an existing folder.

- In the Actions palette, double-click or drag the Copy action from the Folder package.
- In the Source folder field, specify the name and location.
- In the Destination folder field, specify the folder name and location to save the copied folder.
- Select the Overwrite existing files/folders check box to overwrite existing folders with the same name.



Note: If this option is not selected, the system appends a numeric value at the end of the file name. For example, if you save the June_Quarter_report file in a location that has a file with the same name, the system saves the file as June_Quarter_report_(1).pdf. The numeric value is incremented each time you save the file as long as the option is selected.

- Select the Size check box to copy a folder based on its size.
 - Select any of the following options from the list:
 - Atleast: Copies a folder only if the folder size is more than the size you have specified.
 - Atmost: Copies a folder only if the folder size is less than the size you have specified.
 - Exact: Copies a folder only if the folder size is the same as the size you have specified.
 - In the Size field, specify the folder size.
- Select the Date check box to copy a folder based on the date.
 - Select any of the following options from the list:
 - Created: Enables you to copy a folder based on the date it was created.
 - Modified: Enables you to copy a folder based on the date it was modified.
 - In the Is within last, specify the value.

This option enables you to perform the operation on the folder if it was created or modified within the last number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the folder if it was created or modified in the last 7 days.
 - In the Is between, specify the period.

This option enables you to specify a Start date and an End date of the period. For example, if you specify 01/01/19 and 01/31/19 as the start date and end date of the period, the system performs the operation on the folder if it was created or modified between this period.



Note: The Start date and End date are included in the period.

- d) In the Is before, specify the value.

This option enables you to perform the operation on the folder if it was created or modified on or before the date you have specified.

7. Click Save.

Using Delete action

Use the Delete action to delete a folder.

1. In the Actions palette, double-click or drag the Delete action from the Folder package.
2. In the Folder field, specify the name and location.
3. Select the Size check box to delete a folder based on its size.
 - a) Select any of the following options from the list:
 - Atleast: Deletes a folder only if the folder size is more than the size you have specified.
 - Atmost: Deletes a folder only if the folder size is less than the size you have specified.
 - Exact: Deletes a folder only if the folder size is the same as the size you have specified.
 - b) In the Size field, specify the folder size.
4. Select the Date check box to delete a folder based on the date it was created or modified.
 - a) Select any of the following options from the list:
 - Created: Enables you to delete a folder based on the date it was created.
 - Modified: Enables you to delete a folder based on the date it was modified.
 - b) In the Is within last, specify the value.

This option enables you to perform the operation on the folder if it was created or modified within the last number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the folder if it was created or modified in the last 7 days.
 - c) In the Is between, specify the period.

This option enables you to specify a Start date and an End date of the period. For example, if you specify 01/01/19 and 01/31/19 as the start date and end date of the period, the system performs the operation on the folder if it was created or modified between this period.



Note: The Start date and End date are included in the period.

- d) In the Is before, specify the value.

This option enables you to perform the operation on the folder if it was created or modified on or before the date you have specified.

5. Click Save.

Using Rename action

Use the Rename action to rename a folder.

1. In the Actions palette, double-click or drag the Rename action from the Folder package.
2. In the Folder field, specify the name and location.
3. In the New folder name field, specify a new name.
4. Select the Size check box to rename a folder based on its size.
 - a) Select any of the following options from the list:
 - Atleast: Renames a folder only if the folder size is more than the size you have specified.
 - Atmost: Renames a folder only if the folder size is less than the size you have specified.
 - Exact: Renames a folder only if the folder size is the same as the size you have specified.
 - b) In the Size field, specify the folder size.
5. Select the Date check box to rename a folder based on the date it was created or modified.
 - a) Select any of the following options from the list:
 - Created: Enables you to rename a folder based on the date it was created.
 - Modified: Enables you to rename a folder based on the date it was modified.
 - b) In the Is within last, specify the value.
 This option enables you to perform the operation on the folder if it was created or modified within the last number of days you have specified. For example, if you specify 7 in the field, the system performs the operation on the folder if it was created or modified in the last 7 days.
 - c) In the Is between, specify the period.
 This option enables you to specify a Start date and an End date of the period. For example, if you specify 01/01/19 and 01/31/19 as the start date and end date of the period, the system performs the operation on the folder if it was created or modified between this period.



Note: The Start date and End date are included in the period.

 - d) In the Is before, specify the value.
 This option enables you to perform the operation on the folder if it was created or modified on or before the date you have specified.
6. Click Save.

Using Unzip action

Use the Unzip action to extract compressed files and folders from a zip file to a specific location.

1. In the Actions palette, double-click or drag the Unzip action from the Folder package.
2. In the Zip file name with full path field, specify the name and location.
3. In the Extract to path field, specify the location.
4. Select the Replace existing file check box to overwrite the file.
5. Optional: In the Password to access zip file field, select either Credential to specify a stored password, or select String to enter a password manually.
6. Click Save.

Using the Zip action

Use the Zip action to compress files and folders into a zip file.

1. In the Actions palette, double-click or drag the Zip action from the Folder package.
2. In the Specify file(s)/folder(s) to compress field, specify the location.
3. In the Specify file type(s) to compress field, select one of the following options:
 - String: Specify the file extension.
For example, you can specify .txt and .png to compress only text files and PNG images. The system compresses the entire folder if you do not specify any file type. You can also specify the name of a file to compress a specific file.
 - Regex: Select the regular expression (regex) either as a String or Pattern for each regular expression condition and enter the value.
For example, you can use regular expressions either as a String and enter the value as My_ for all file name starting with My_ or as a Pattern such as [a-z]{3}(.txt|xlsx) to retrieve files that matches this pattern.
4. In the Specify destination filename and location field, specify the zip file name and location.
5. Select the Update only if newer check box to compress the files only if one or more files were updated after the last compression.
This option is useful when you are repeatedly compressing the same set of files and storing the output zip file with the same name at the same location. For example, you compress five PDF files from the Reports folder on a monthly basis and save the output zip file with the Monthly Report name in the D: drive. When this option is selected, the system compresses the files only if one or more PDF files are updated after the last compression.
6. Select the Delete original files check box if you want to delete the original files after they are included in the zip file.
7. In the Compression list, select between Normal, Fast, and Superfast to specify the speed for compression.
8. Optional: In the Password protection field, select Credential to specify a stored password or select String to enter a password manually.
9. Click Save.

FTP / SFTP package

Use the FTP / SFTP package to automate FTP / SFTP operations.

An FTP/SFTP server hosts the files to share. The client accesses, downloads, or uploads files to the server. The transfer of data between the client and server is done using a TCP/IP network, which is the standard protocol of communication over the internet.

- The following are some forms of authentication for an FTP server:
 - User credentials: Requires an FTP username and password.
 - Anonymous: This form of authentication is enabled on sites where files are available for public access and the users need not identify themselves to the server.
 - Key-based: SFTP authentication is usually done with a private and public key. The key pair is automatically generated by the computer. The private key is kept with the SFTP client and the corresponding public key with the SFTP server. When establishing a connection, the client shares the private key to be matched with the corresponding public key on the server.
- FTP can run in active or passive transfer mode.

- In the active mode, the client informs the server about the port used for listening and starts listening for incoming data connections from the server.
- In the passive mode, the client receives a server IP address and server port number from the server. The client opens a data connection to the server IP address and server port number that are received. Most organizations prefer the passive mode because it involves less or no alterations to the firewall settings.
- FTP supports binary and ASCII file transfer types:
 - Use the binary option when transferring executable files.
 - Use the ASCII option when transferring text files.

Before you start

Perform the following actions within the FTP / SFTP package.

1. Establish a connection with the FTP/SFTP server using the Connect action. When establishing a connection, associate the FTP/SFTP server details with a session name. Use the same session name for all corresponding actions.
2. Use the FTP/SFTP actions to automate a task. The actions enable you to perform following tasks:
 - Upload, download, delete, or rename files.
 - Upload, download, create, or delete folders.
 - Navigate to the parent folder or a specific folder.
3. After you have automated the tasks related to FTP / SFTP, terminate the connection to the server using the Disconnect action.



Note: SFTP with SSH1 protocol is no longer supported by SFTP.

Actions in the FTP / SFTP package

The FTP / SFTP package includes the following actions:

Action	Description
Change folder	Navigates to either the parent folder or another specific folder on an FTP/SFTP server. • Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. • Select either Go to parent folder or Specific folder in Navigate to options. If the Specific folder option is selected, enter the complete folder path.
Connect	See Using Connect action for FTP/SFTP on page 641.

Action	Description
Create folder	Creates a folder in an existing folder on the FTP/SFTP server. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Specify the folder name in the Remote folder field with the path to create a folder on the FTP server.  Note: The system encounters an error if a folder with the same name exists in the parent folder.
Delete files	Deletes files from an FTP/SFTP folder. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Specify file names in the Remote files field along with the complete path, separated by a semicolon.
Delete folder	Deletes a folder (including all the subfolders and files within it) from an FTP/SFTP server. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Specify the folder name in the Remote folder field.
Disconnect	Terminates the connection to the FTP/SFTP server. Enter the session name – Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.
Get files	Downloads files from a remote FTP/SFTP folder to a specific folder on the client machine. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Select files on the remote FTP server that you want to download on the local system. - In the Local folder field, enter the name of the folder where you want to download files from the FTP/SFTP server. - Select the Transfer Type as Binary or ASCII. - You can also specify folders based on the date they are created or modified.

Action	Description
Get folders	Downloads a folder from an FTP/SFTP server to a client machine. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Select folders on the remote FTP server that you want to download on the local system. Specify filters using wildcard characters to download only specific types of files. - In the Local folder field, enter the name of the folder where you want to download files from the FTP/SFTP server. - You can also specify folders based on the date they are created or modified.
Put files	Uploads one or more files from the client machine to the FTP/SFTP server. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Enter all the file names along with their location, separated by a semicolon. - Select the Transfer type to be either Binary or ASCII
Put folders	Uploads a folder from the client machine to the FTP/SFTP server. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - Enter the folder name in the Local folder field which you want to upload on FTP/SFTP server. - Specify filters using wild card characters to restrict uploads to specific types of files.
Rename files	Renames files in an FTP/SFTP folder. - Enter the session name. Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action. - In the Remote file field, enter the name of the file that you want to rename. - Enter the new name in the New remote file field.

Using Connect action for FTP/SFTP

Use the Connect action to establish a connection with the FTP/SFTP server that you want to use to automate tasks. This must be the first action you use to automate an FTP/SFTP-related task.

Specify details of the FTP/SFTP server and associate it with a session name. Use the session name provided in this action in the other actions so that you do not have to provide details of the server in those actions.

To establish a connection with an FTP/SFTP server, perform these steps:

1. Double-click or drag the Connect action from the FTP/SFTP node in the Actions palette.
2. Enter a name for the session in the Session name field.
3. Enter the FTP/SFTP server name in the Server name field.
4. Specify the port number.
5. Select one of the following options to specify the server type:

Option	Steps
FTP	Authentication type: You can either choose to authenticate the user using User credentials or log in as Anonymous. If you choose User credentials, complete these fields: Username: Select Credential for enhanced security or String: • Credential: Select the Credential Vault variable to insert the Username and Password. • String: Enter the value directly in the field. Transfer Mode: Select the transfer mode to be Active or Passive. Transfer type: Select the type to be either Binary or ASCII for transferring files between the server and client. Optional: Enter the default directory path on the FTP server.
FTP Secure	Authentication type: You can either choose to authenticate the user using User credentials or log in as Anonymous. If you choose User credentials, complete these fields: Username: Select Credential for enhanced security or String: • Credential: Select the Credential Vault variable to insert the Username and Password. • String: Enter the value directly in the field.

Option	Steps
SSH FTP	Select the Private Key File from Control Room file, Desktop file, or Variable.  Note: Ensure that the SFTP server has a corresponding public key file. You can either choose to authenticate the user using User credentials or log in as Anonymous. If you choose User credentials, complete these fields: - With username: To enter the Username, select Credential or String option. Credential: Select the Credential Vault variable to insert the Username. String: Enter the value directly in the field. - With username-password: To enter the Username and Password, select either the Credential or String option. If you choose to authenticate using the user credentials, insert a Credential Vault variable for enhanced security or enter the value directly in the string field.
6.	Select Reconnect if connection fails if you want to automatically reconnect:  Note: If the connection fails due to incorrect credentials, the action will not attempt to reconnect. a) Specify the number of attempts in the Attempts field. b) Select the time lapse in the Time between attempts field.
7.	Click Save.

Fuzzy match package

Use the Fuzzy match action to compare the values of two strings or files for similarity. This action returns a decimal value; the closer the value to 1.0, the greater the similarity between the two strings.

Use this action to automate the process of evaluating strings of data for similarity. For example, you have an automation sequence in which a bot extracts data from invoices, searches a database for the company record, and updates the record with data from the invoice. Use the Fuzzy match action to handle two possible scenarios:

- A mistake occurs at the extraction step where a letter is incorrectly extracted. Instead of Apple, the bot extracts App1e, with a numerical one instead of the letter l.
- There is a small variation between the company name on the invoice and in the database. The invoice contains the company name Apple Inc, but the database has a record for the company name Apple.

G-Suite Apps package

The G-Suite Apps package contains the OAuth action, which enables you to authorize and connect to the G-Suite server. With this package, you only have to provide your credentials once.

Use the OAuth action to establish a connection with the G-Suite server using the client ID, redirect URI, and client secret. Insert this action at the beginning of automation sequences that use Google packages

so that you have to input the credentials only once. All of the fields in this action accept a credential from the Credential Vault or a user-input value.

To use this action, provide the following:

- Client ID: Identifies the client application.
- Redirect URI: Identifies the application that receives the data from Google.
- Client Secret: Client access token.

To retrieve your credentials, see [Obtain OAuth Credentials](#).

Google Calendar package

The Google Calendar package contains actions that enable you to automate creating and deleting events.

Before you start

Perform the following actions within the Google packages as part of using the set of available actions:

1. Use the OAuth action from the G-Suite Apps package to establish a connection to the G-Suite server. For more information on establishing a connection, see the [G-Suite Apps package](#) on page 642.
2. Use a combination of actions available in the Google packages to automate your tasks.



Note: You can automate tasks using actions from different packages with the same connection.

Actions in the Google Calendar package

The Google Calendar package includes the following actions:

Action	Description
Create event	See Using the Create new calendar event action on page 643.
Delete event	Removes the event from the calendar. • Enter the same session name that you provided in the OAuth action. • Enter the Event Id. • Optional: Assign the event to a String variable.

Using the Create new calendar event action

Use the Create new calendar event action to specify event attendees, duration, location, recurrence, and title. During run time, this action triggers an email notification to meeting attendees.

To create a new calendar event, do the following:

1. Enter the session name you used to connect to the G-Suite server in the OAuth action. See [G-Suite Apps package](#) on page 642.
2. Enter the event title.
3. Optional: Enter the location.

4. Optional: Enter the attendees' email addresses, separated with commas.
5. Enter the start date.
Use the format yyyy-MM-dd.
6. Enter the end date.
Use the format yyyy-MM-dd.
7. Select the All Day or Specify Time option from the Event Time option.
 - If you select the All Day option, you do not need to provide any additional details.
 - If you select the Specify Time option, complete the following fields:
 - Specify the Start Time using the HH:mm:ss format.
 - Specify the End Time using the HH:mm:ss format.
8. Select the Use System Timezone or Specify Timezone option from the Timezone option.
 - If you select the Use System Timezone option, you do not need to provide any additional details.
 - If you select the Specify Timezone option, complete the following fields:
 - Specify the Start Timezone.
 - Specify the End Timezone.
9. Optional: Mark the Recurring option to make this event repeat.
10. Select a Visibility option from the drop-down list.
Select from Default, Public, or Private.
11. Optional: Enter an event description.
12. Optional: Select a string variable from the drop-down list to store the id of the created event.
13. Click Save.

Google Drive package

The Google Drive package contains actions that enable you to automate tasks related to files and folders.

Before you start

Perform the following actions within the Google packages as part of using the set of available actions:

1. Use the OAuth action from the G-Suite Apps package to establish a connection to the G-Suite server.
For more information on establishing a connection, see the [G-Suite Apps package](#) on page 642.
2. Use a combination of actions available in the Google packages to automate your tasks.



Note: You can automate tasks using actions from different packages with the same connection.

Actions in the Google Drive package

The Google Drive package includes the following actions:

Action	Description
Copy file	Copies a file from one folder to another in the Google Drive • Enter the same session name that you provided in the OAuth action. • Select whether to identify the source file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</code>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>. • Select whether to identify the destination folder by directory path and name, or by ID. • Optional: Mark the Rename file option and enter the new file name.
Create file permission	Creates a new permission for a file. • Enter the same session name that you provided in the OAuth action. • Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</code>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>. • Select a role. For more information, see Google Drive Roles. • Select the grantee type. Choose from: • User • Group • Domain • Anyone • If you select User or Group, enter the email address. If you select domain, enter the domain. • Optional: Select or create a variable to hold the permission ID.

Action	Description
Delete file	Deletes a file on your Google Drive. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Optional: Select or create a boolean variable to hold the file delete status.
Delete file permission	Deletes a file permission for a file. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - In the Permission id field, enter the permission ID. - Optional: Select or create a variable to hold the permission ID.
Download file	Downloads a file from your Google Drive to a specific location on your desktop. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Specify the download file path. For example, <code>C:/Users/Downloads</code>. - Optional: Mark the Overwrite existing file option to overwrite the file of the same name. - Optional: Mark the Rename file option to enter a new name for the downloaded file. - Optional: Select or create a variable to hold the ID of the downloaded file.

Action	Description
Find file/folder	Finds files or folders in a specific directory in your Google Drive. • Enter the same session name that you provided in the OAuth action. • Select whether to search for files or folders. • Enter the source folder to search in. For example, /Home/Accounts/. • Specify whether to return exact matches or • Enter the file or folder name to search for. • Select or create a variable to hold the list of files or folders.
Get file information	Gets file information of a file. • Enter the same session name that you provided in the OAuth action. • Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. • Select or create a dictionary variable to hold the file information which is stored in two keys: the <code>name</code> key holds the file name and the <code>extension</code> key holds the file extension.
Get file permission	Retrieves file information for specific file or folder from Google Drive. • Enter the same session name that you provided in the OAuth action. • Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. • Select or create a list variable to hold the file permissions.

Action	Description
Move file	Moves a file from one folder to another. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Select whether to identify the destination folder by directory path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>.
Open file	Opens a file from the specified directory in Google Drive. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>.
Open folder	Opens a folder from the specified directory in Google Drive. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the folder by directory path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>.

Action	Description
Rename file	Renames a file in the Google Drive. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Enter the new file name.
Rename folder	Renames a folder in a specific directory in Google Drive. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the folder by directory path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Enter the new folder name.
Upload file	Uploads a file from the desktop to your Google Drive. - Enter the same session name that you provided in the OAuth action. - Enter the file path and name. - Select whether to identify the folder where to upload the file by directory path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - Optional: Mark the Overwrite existing file option to overwrite the file of the same name. - Optional: Select or create a variable to hold the ID of the uploaded file.

Action	Description
Update file permission	Update the permissions for a file. - Enter the same session name that you provided in the OAuth action. - Select whether to identify the file by file path and name, or by ID.  Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12dlAwvrEA4JeLysfFky9</code>, the ID is <code>12dlAwvrEA4JeLysfFky9</code>. - In the Permission id field, enter your user ID. - Select a role. For more information, see Google Drive Roles. - Optional: Select or create a variable to hold the permission ID.

Google Sheets package

The Google Sheets package contains actions that enable you to automate tasks involving cells, columns, rows, and sheets.

Before you start

Perform the following actions within the Google packages as part of using the set of available actions:

1. Use the OAuth action from the G-Suite Apps package to establish a connection to the G-Suite server. For more information on establishing a connection, see the [G-Suite Apps package](#) on page 642.
2. Use the Open spreadsheet action from the Google Sheets package to select a workbook, or the Create spreadsheet action to create a new workbook.
3. Optional: If the workbook contains more than one sheet, use the Activate sheet action to specify which sheet to use.
4. Use the Close action to exit from the workbook.

Actions in the Google Sheets package

The actions in the Google Sheets package enable you to perform the following operations:

Action	Description
Activate sheet	Activates a specific sheet in the open spreadsheet. - Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. - Specify whether to activate the sheet by index or name.

Action	Description
Create spreadsheet	Creates a new spreadsheet in your Google Drive. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Optional: Enter the file path. If you do not enter a value, the spreadsheet will be created under <code>my-drive</code>. • Enter the spreadsheet name. • Select a variable to hold the ID of the created spreadsheet.
Close	Saves and closes the current spreadsheet. Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.
Create worksheet	Creates a new sheet in the open spreadsheet. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Specify whether to create the sheet by index or name
Delete cells	Deletes cells within a worksheet. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Select either the Active cell or Specific cell option. If you have selected the Specific cell, enter the cell address. • Select from the following delete options: • Shift cells left • Shift cells up • Entire row • Entire column
Delete worksheet	Deletes a sheet from the current spreadsheet. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Specify whether to delete the sheet by index or name.
Find cells which contains search key	See Using the Find action on page 654

Action	Description
Get multiple cells	Retrieves the values from the cells in a Google sheet and stores them in a table variable. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Select the Multiple cells option to retrieve values from a range of cells, or select All cells to retrieve values from all the cells. • Select or create a table variable to hold the output.
Get single cell	Retrieves the value from the specific cell in a Google sheet and stores it in a string variable. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Select either the Active cell or Specific cell option. If you have selected the Specific cell, enter the cell address. • Select or create a string variable to hold the output.
Go to cell	Goes to the specified cell. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Select either the Specific cell or Active cell option. • If you have selected the Specific cell option, enter the cell address. For example, B4. • If you have selected the Active cell option, select the direction in which to move from the active cell.

Action	Description
Open spreadsheet	Opens an existing spreadsheet. • Enter a session name. Use this session name in subsequent actions to associate them with this spreadsheet. • Select whether to open the spreadsheet by name, URL, or spreadsheet ID: • Name: Enter the file name. • URL: Enter the entire URL. • Spreadsheet ID: The ID is the value in the URL after the last forward slash. For example, if the URL is <code>https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</code>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>. • If the spreadsheet contains multiple sheets, select the Specific sheet name option and enter the sheet name.
Read column	Retrieves data from a column and stores it in a list variable. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • In the Cell name field, specify the cell location from which to read the values. For example, enter <code>A5</code> to retrieve all the values located in the first column, below the fifth row. • You can also select the Read full column option to extract values from the entire column. • Select or create a list variable to hold the output.
Read row	Retrieves data from a row and stores it in a list variable. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • In the Cell name field, specify the cell location from which to read the values. For example, enter <code>D5</code> to retrieve the values located in the fifth row and right of the fourth column. • You can also select the Read full row option to extract values from the entire row. • Select or create a list variable to hold the output.

Action	Description
Set cell	Sets the value of a specific cell. • Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action. • Enter the address of the cell. For example A5. • Enter the value to set. • Select or create a string variable to hold the value of the cell.

Using the Find action

Use the Find cells which contain search key action to find a particular string in a Google sheet.

To find a value in a Google sheet, do the following:

1. Double-click or drag the Find cells which contain search key action from the Google Sheets node in the Actions palette.
2. Enter the same session name that you provided in the OAuth action.
3. Select an option from the From list to specify a starting point of the cell range for search:
 - Beginning: Starts the search from the beginning of the spreadsheet.
 - End: Starts the search from the end of the spreadsheet.
 - Active cell: Starts the search from the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell from where you want to start the search.
4. Select an option from the Till list to specify an end point of the cell range for search:
 - Beginning: Ends the search at the beginning of the spreadsheet.
 - End: Ends the search at the end of the spreadsheet.
 - Active cell: Ends the search at the active cell in the spreadsheet.
 - Specific cell: Enables you to specify the address of the cell where you want to end the search.
5. Select from the following search options:
 - By rows: Enables you to search by rows.
 - By columns: Enables you to search by columns.
 - Match by case: Only performs this action on cells that contain a string that matches the uppercase and lowercase characters of the string you specified in the Find field.
 - Match entire cell contents: Enables you to find only those cells that contain the entire string you have specified in the Find field.
6. Enter the string you want to search for in the Find field.
7. Optional: Mark the Replace option and enter the string to replace the matching values.
8. Select the list variable of string data type that you want to use to store the output from the Assign cell addresses variable list.
9. Click Save.

IBM Watson Authentication package

The IBM Watson Authentication package contains actions that enable you to authenticate the API token and location URL for each service, while connecting to and disconnecting from your IBM Cloud account. With this package, you only have to provide your credentials once.

Before you start

Each service requires a unique API key and location URL. Log in to your IBM Cloud account to create an instance of the service to obtain the API Key and location URL. Automation Anywhere Version A2019 currently includes [Speech to Text](#).

Actions in the IBM Watson Authentication package

Action	Description
Connect	Establishes a connection with the IBM Cloud account. Insert this action at the beginning of automation sequences that use IBM Watson packages so that you have to input the credentials only once. To use this action, select the services to connect with, then provide the API Key and URL for each service you will use.
Disconnect	Terminates the connection with the IBM Cloud account. Insert this action at the end of automation sequences that use IBM Watson packages.

IBM Watson Speech to Text package

This package supports the following audio file formats: flac, mpeg, mp3, ogg, pcm, wav, and webm. The following languages are supported: Arabic, Brazilian Portuguese, Chinese (Mandarin), English (United Kingdom and United States), French, German, Japanese, Korean, Spanish (Argentinian, Castilian, Chilean, Colombian, Mexican, and Peruvian).

Feature	Description
Detect speakers	Identifies the individuals in a conversation between multiple people. • Supports English, Japanese, and Spanish. • Use for conversation between two people; maximum six people. • For best results, use an audio file at least a minute long. The output contains the words spoken by each speaker and the timestamp.
Keyword spotting	Detects specific strings in the transcript. The output contains the timestamp(s) for each keyword and a confidence score.

Feature	Description
Smart formatting	Converts the following types of strings into more conventional representations to make the transcript easier to read: • Dates • Times • Series of digits and numbers • Phone numbers • Currency values • Email and web addresses For examples, see Smart formatting results. This feature supports English, Japanese, and Spanish.
Profanity filter	Obscures profanity by replacing it with asterisks in the transcript.

If package

Use the actions in the If package to control the sequence of execution based on one or more conditions of a task.

Use the actions in the If package to check if an application is running, a folder or file exists, a variable matches the specified value, an application window exists, or a machine or server is running, before executing a set of actions.

Actions in the If package

The If package includes the following actions:

Action	Description
If	Specifies a condition and holds a sequence of actions to run if the condition is true. See Using If action on page 660. You can configure multiple conditions within a single If action. 1. Click Add condition. 2. Select either of the following options: • And: Both of the conditions must be met for the actions to run. • Or: Either of the conditions must be met for the actions to run. 3. Select the condition from the drop-down list.

Action	Description
Else if (optional)	Specifies an alternative condition to test if the condition specified in the If action is false. If this alternative condition is true, the bot runs the sequence of actions contained within the Else if action. You can configure multiple conditions within a single Else if action. 1. Click Add condition. 2. Select either of the following options: • And: Both of the conditions must be met for the actions to run. • Or: Either of the conditions must be met for the actions to run. 3. Select the condition from the drop-down list.
Else	Specifies the alternative sequence of actions if the condition specified in the If action and Else if action (if used) is false.

Conditions in the If action

Use the following conditions in the If action to control the flow of execution in an automation task:

Condition	Description
Application	Use the Application is not running or Application is running condition to execute actions based on whether an application is running or not running. Enter the application path or specify the path using a variable along with the amount of time to wait (in seconds) for the condition to be true.
Boolean	Use the Boolean variable condition to execute actions based on whether a Boolean variable contains the value True or False. You can also use this condition to compare the values of two Boolean variables by selecting the second variable from the Insert a Variable window.
Data table	Use the Data table is empty condition to execute actions based on whether the specified table contains values. Use the Number of rows and Number of columns conditions to execute actions based on whether the number of columns or rows is Equal to, Greater than, or Less than the specified value.
Datetime	Use the Datetime variable condition to execute actions based on whether the value of the source datetime variable is Equal to or Not Equal to, is Greater than or Equal to, or is Lesser than or Equal to the value of the target datetime variable.

Condition	Description
Dictionary	Use the Check key condition to execute actions based on whether the value of the specified key is Equal to or Not equal to, or Contains or Does not contain the target value.  Note: The key comparison is case-sensitive. Use the Check for a single value condition to execute actions based on whether a specific key contains the target value.
File	Use the following conditions to execute the action: - File date Use this condition to verify the date and time that the specified file was created or modified. Specify a date range using the Is within last, Is between, or Is before options. For the Is within last option, specify the number of days or time (in hours, minutes, and seconds). Enter the amount of time (in seconds) to wait for this condition to be true. - File exists and File does not exist Use these conditions to execute an action based on whether a file exists. For example, if a data file exists, format the file and upload it to a database. - File size This condition verifies if the specified file is larger, smaller, not the same, or the same as the size you specify. Enter the amount of time (in seconds) to wait for this condition to be true.
Folder	Use the Folder exists or Folder does not exist condition to execute an action based on whether a folder exists.
Image Recognition	Use these conditions to verify whether: - Image file is found in the Image file or not. - Image file is found in the Window or not. - Window is found in the Image file or not. - Window is found in the Window or not. For the Window conditions, you can use the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.  Note: This option is only available for windows that can be resized. It is not available for Desktop or Taskbar options.
JavaScript	Use the Script is successful or Script is unsuccessful condition to execute actions based the status of the specified JavaScript. Select the file that contains the script and optionally specify the parameters by selecting a list variable.

Condition	Description
Legacy automation	The Legacy automation conditions are only used in migrated bots to ensure that they run seamlessly in Enterprise A2019. We do not recommend using these conditions for new bot development. The following conditions to verify the following: • Whether Web control exists or not. • Whether Window control exists or not. • Whether Window control is active or not. • Whether Script is successful or not. • Whether Child window exists or not. For the Window control conditions, you can use the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.
List	Use the List variable condition to execute actions based on whether the specified list variable contains a particular value. The value can be of Number, String, or Boolean data type.
Number	Use the Number variable condition to execute actions based on whether the specified number variable is Equal to or Not Equal to, or is Greater than or Equal to, or is Lesser than or Equal to a particular value.
Ping	Use the Ping is successful or Ping is unsuccessful condition to verify if a machine or server is running, and execute actions based on the result. Enter the amount of time (in seconds) to wait for the condition to be true.
Recorder	Use this condition to detect an Object in a window. Select a window or variable to capture the object. Enter the amount of time (in seconds) to wait for this condition to be true.
Service	Use the Service is running or Service is not running condition to execute actions based on whether a service is running or not. Select Service list to choose a service from the list of available services.
String	Use the String variable condition to execute actions based on whether the specified source string value is Equal to or Not equal to, or Includes or Does not include the target value. You can select the Match case option to only execute actions if the two strings have matching uppercase and lowercase letters. When you extract text from a Microsoft application, the extracted text contains the <code>/r/n</code> special characters which indicate a new line. Select the Ignore Carriage return option if you want to ignore the <code>/r</code> special character when you compare the text. To create a condition based on whether a string is empty or not empty, compare the source value to an empty target field using the Equal to operator. See Example of using a conditional statement on page 892.
Task Bot	Use the Task successful or Task unsuccessful condition to execute actions based on the status of the specified Task Bot.

Condition	Description
VBScript	Use the Script is successful or Script is unsuccessful condition to execute actions based on the status of the specified Visual Basic script. Select the file that contains the script and optionally specify the parameters by selecting a variable.
Window	Use the Window exists or Window does not exist condition to verify if a specific application window is open by entering the Window title or using a variable. Enter the amount of time (in seconds) to wait for the condition to be true.

Example

[Build a basic bot that uses a desktop application](#) on page 887

An example of how to build a basic TaskBot that uses the If package.

Using If action

Use the If Else If and If Else actions to change the flow of execution in an automation task based on certain conditions.

To use the actions in the If package, do the following:

1. Double-click or drag the If action from the If package in the Actions palette.
2. Select the required condition from the Condition list.
See [If package](#) on page 656 for a list of available conditions.
3. Drag the actions to be executed if the condition is satisfied within the If condition.
4. Double-click or drag the Else If action from the If package in the Actions palette to include alternative actions to run if the condition for the If action is false, and if the condition for the Else If action is true.
5. Drag the actions to be executed if the condition is satisfied within the Else If condition.
6. Double-click or drag the Else action from the If package in the Actions palette to include actions to run if the conditions for the If and Else If actions are false.
7. Drag the actions to be executed if the condition is satisfied within the Else condition.
8. Click Save.

Image Recognition package

The Image Recognition package contains actions that enable you to search for a user interface (UI) element in an application based on an image to automate a task in that application.

Actions in the Image Recognition package

Use these actions to automate a task when it is not possible to capture UI elements of applications that are:

- Exposed over Citrix
- Accessed using the Remote Desktop Protocol (RDP)
- Developed using legacy technology

Image recognition is also useful when object-based recognition does not work or is unreliable. For example, you can use an image to search for the Close button in an application and perform a left-click operation.

The Image Recognition package contains the following actions:

Action	Description
Find image in window	See Using Find image in window action on page 661.
Find window in window	See Using the Find window in window action on page 663.

Logging and debugging

If a bot fails while running one of the Image Recognition actions, the captured source and target images are stored in the log folder. Use the images to identify issues such as the application image not captured correctly or low quality of the image due to differences in the Bot Creator and Bot Runner devices.



Note: When secure recording is ON and Image Recognition fails, the bot does not store images in the log folder.

Navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\IR` to view the captured application images. The folder stores a maximum of 10 source and target image pairs. When the maximum is reached, the oldest image pairs are overwritten with new images.

Secure Recording

When secure recording mode is enabled, bots do not capture object images or values. This ensures that sensitive data is not stored in the bots.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#) on page 1131.

Using Find image in window action

Use the Find image in window action to search for a UI element in an application window (haystack) using a target image (needle). The target image is an existing image that you can use to search for a UI element.

To find an image inside an application window, follow these steps:

1. Double-click or drag the Find image in window action from the Image Recognition package in the Actions palette.
2. Specify the window (haystack) in which you want to find the image:
Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.

Option	Description
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad)` for all the window title names starting with `((\w*) -Notepad)`, or use Pattern such as `((\w*) \s) *document-Notepad` for only those window titles that match this pattern.

3. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

4. Click Capture region.

The selected window appears.

5. Drag the mouse to select the area and right-click when done.

The captured area appears in the Preview section with the image coordinates underneath.

6. In the Wait before capturing the image (ms) field, specify the delay (in milliseconds) before searching for the image.

7. Specify the target image (needle) that you want to find in the application window.

- Control Room file: Uses an image file that is available on the Enterprise Control Room.
- Desktop file: Uses an image file that is available on your device.
- Variable: Uses a file variable to specify the location of the image file you want to use.



Note: Images of .jpeg, .jpg, .jpe, .jfif, .bmp, .png, and .gif formats are supported.

8. In the Image occurrence field, enter a value to specify the occurrence of the target image on which you want to perform this action.

9. In the Match percentage field, specify the acceptable percentage of matching pixels between the two images.

For example, if you specify 20 in the field as the match percentage, the system considers the images as matching even if there is up to 80% of pixel mismatch between the two images.

10. Select a click action:

- Click match: During runtime, the bot clicks in the center of the matched image.
- Offset from match: During runtime, the bot clicks in the specified offset coordinates.



Note: The offset coordinates measure the number of pixels from the top left corner of the image.

11. Select an option from the Action list to specify the action you want to perform on the matched image in the application window.
12. Optional: Select the Repeat if image not found check box if you want the system to retry searching for the target image if it is not found.
 - a) In the Times field, specify the number of times the system must repeat the process to find the target image.
 - b) In the Wait between repeats field, specify the time period the system must wait before repeating the process of finding the target image.
13. Click Save.

Using the Find window in window action

Use the Find window in window action to search for a UI element in an application window using a screenshot of a window. This action enables you to capture an image of a UI element in an application and use the captured image to search for that UI element in another window.

To use an image available in an application window to find an image in another application window, follow these steps:

1. Double-click or drag the Find window in window action from the Image Recognition package in the Actions palette.
2. Specify the window (haystack) in which you want to find the image:
Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad)` for all the window title names starting with `((\w*) -Notepad)`, or use Pattern such as `((\w*) \s) *document-Notepad` for only those window titles that match this pattern.

3. Optional: Select the Resize window option to specify the window dimensions.
This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.
 - If the window is maximized when you record the task, this option is unselected.
 - If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

4. Click Capture region.
The selected window appears.
5. Drag the mouse to select the area and right-click when done.
The captured area appears in the Preview section with the image coordinates underneath.
6. Specify the target image (needle) that you want to find in the application window.
 - Captured image: Enables you to capture the image relative to the screen or window.
If you select Captured image, perform steps 7 through 9. Otherwise, skip to step 10.
 - Control Room file: Uses an image file that is available on the Enterprise Control Room.
 - Desktop file: Uses an image file that is available on your device.
 - Variable: Uses a file variable to specify the location of the image file you want to use.



Note: Images of .jpeg, .jpg, .jpe, .jfif, .bmp, .png, and .gif formats are supported.

7. Specify whether to capture the image relative to the screen or window.
Use the Window option when you work with varying screen resolutions (for example, a dual monitor).
8. Click Capture image to capture the target image.
9. Drag the mouse pointer over an area of the application window.
The captured area appears in the Preview section.
10. In the Image occurrence field, enter a value to specify the occurrence of the target image on which you want to perform this action.
11. In the Match percentage field, specify the acceptable percentage of matching pixels between the two images.
For example, if you specify 20 in the field as the match percentage, the system considers the images as matching even if there is up to 80% of pixel mismatch between the two images.
12. Select a click action:
 - Click match: During runtime, the bot clicks in the center of the matched image.
 - Offset from match: During runtime, the bot clicks in the specified offset coordinates.



Note: The offset coordinates measure the number of pixels from the top left corner of the image.

13. Select an option from the Action list to specify the action you want to perform on the matched image in the application window.
14. Optional: Select the Repeat if image not found check box if you want the system to retry searching for the target image if it is not found.
 - a) In the Times field, specify the number of times the system must repeat the process to find the target image.
 - b) In the Wait between repeats field, specify the time period the system must wait before repeating the process of finding the target image.
15. Click Save.

Interactive forms package

The interactive forms package contains actions that handle exceptions encountered by a bot. All the actions performed by users on the interactive forms can be monitored to execute logic using subtasks.

Interactive forms are first-class citizens within the bot repository and have the same workflows for moving forms between public and private workspaces, and for export or import actions. Handling exceptions ensures that a bot completes a task when it encounters an error.

Actions in the Interactive forms package

The interactive forms package includes form-level and element-level actions.

The following actions are available at the form level:

Action	Description
Display	Load and display the selected form. Select or insert a variable in the Form name field to display the form when an event is triggered. Optionally, select the check box to always display the form window in front.
Close	Closes the selected form.
Show	Loads or displays a hidden form. Select or insert a variable in the Form name field for a hidden form, which is displayed on the desktop when an event is triggered.
Hide	Hides the selected form from the user's view.
Reset	Resets the selected form to its default value. Select or insert a variable in the Form name field for a form. All the values of this specified form are reset when an event is triggered.
Validate form	Validates all the elements within the selected form. - Select or insert a variable in the Form name field for a specific form, which is validated when an event is triggered. - Select the next event by creating or selecting a variable using the Assign the return value to a boolean variable field.  Note: The Validate form action is not applicable to Rich Text Editor elements.
Change Form Title	Changes the title of the selected form. - Select or insert a variable in the Form name field for a specific form. - Enter the new title that must appear for the selected form in the New Title (optional) field.

The following actions are available at the element level:

Action	Description
Assign	Assigns dynamic values to the Dropdown element of a form. • Select or insert a variable in the Form name field. • Select the Dropdown element of the form from the Form element field, which is enabled when an event is triggered. • Use Assign to set one of the following actions: • Append: Specified values or variables are added to the selected Dropdown element. • Overwrite: Specified values or variables replace the existing data in the selected Dropdown element.
Enable	Enables the specified element of the selected form. • Select or insert a variable in the Form name field. • Select a specific element of the form from the Form element field, which is enabled when an event is triggered.
Disable	Disables the specified element of the selected form.
Get	Retrieves the value from the specified element of the selected form. • Select or insert a variable in the Form name field and use the Form element to select a specific element of the form. • Use the Returns the value drop-down menu to assign this value to a variable when an event is triggered. Create a variable on page 873
Set	Assigns the user-defined or global variable to the selected element of the specified form. • Select or insert a variable in the Form name field and use the Form element to select a specific element of the form. If you select Table as the Form element, use the Set Value Type to enable the following additional options: • Table: Sets the variable value to the entire table. • Row: Sets the variable value to the selected row. • Use the Input value to assign a user-defined or system variable into this element when an event is triggered.
Set focus	Sets the focus on the selected element of a form. • Select or insert a variable in the Form name field. • Use the Form element to select the specific element of the form and set the focus: • For form elements such as a text box, text area, number or date, the cursor appears on the element. • For form elements such as a check box or radio button, the emphasis is on the first option.

Action	Description
Highlight	Highlights the specified element of the selected form. • Select or insert a variable in the Form name field. • Use the Form element to select the specific element of the form to highlight it when an event is triggered. • Use the Highlight Type drop-down menu to select one of the following: • Warning: Displays a warning alert on the specified form element. • Error: Displays an error alert on the specified form element.
Unhighlight	Removes the highlight from the specified element of the selected form.
Change label	Changes the label of the selected form element. • Select or insert a variable in the Form name field. • Use the Form element to select the specific element of the form for which the label must change when an event is triggered. • Enter the name in New label field.
Dynamic area	
Add row in Dynamic area	Applies only to forms that have a Dynamic element. This action renders the selected form field as a single row when the bot starts. • Select or insert a variable in the Form name field. • Use the Dynamic area drop-down menu to select the dynamic element of the form. • Use Append or Overwrite to add a row for the specified dynamic area. • Use Add element to insert elements into the dynamic area. • Use the Type drop-down menu to select the element type such as Checkbox group, Drop-down, File, Radio group, Snapshot, Text area, or Textbox. • Use the Label field to enter a name for the element. • Click Add to add the element. You can add up to four elements.
Clear	Clears all the dynamic elements in the specified form.

IQ Bot (Preview) package

Use the IQ Bot (Preview) package to process and validate documents using IQ Bot with Auto-extraction.



Note: This package is available for IQ Bot Community Edition from A2019.16.

Before you start

Before you start using the actions, create a learning instance.

[Create a learning instance in IQ Bot A2019](#) on page 986

Actions in the IQ Bot (Preview) package

The package includes the following actions:

Action	Description
Document extraction	See Using Document Extraction action on page 668
Validation	See Using Validation action on page 668

Using Document Extraction action

Use the Document Extraction action to process documents using TaskBots created in the Enterprise Control Room.

Create a bot, and then use the IQ Bot (Preview) > Document Extraction action to process your documents and extract data from the production-document fields and tables.

This action extracts documents using IQ Bot with Auto-extraction.

1. Navigate to Bots > My bots and click Create a bot.
2. In the Create Task Bot window, enter a name and click Create & edit.
3. The bot designer window appears.
4. In the Edit Task Bot > Actions column, search for IQ Bot to display the available actions.
5. Drag the IQ Bot (Preview) > Document Extraction action into your workflow.
6. In the Input File Path field, use Browse to navigate to the file you want to process.
7. From the drop-down list, select your learning instance.



Recommendation: Do not use the Learning Instance configuration file option because this is used for backward-compatibility only and will be deprecated in upcoming versions of the product.

8. In the Assign the status to the output variable field, select prompt-assignment – String from the drop-down list.
The action response code is saved in the provided variable.
9. Optional: Drag the Message box action to display results in the message box. Define the message you want to see displayed in the message box.
 - a) Click the Insert a value (F2) icon in the Enter the message to display field.
 - b) In the Insert a value dialog box, select prompt-assignment - String from the drop-down list and click Yes, insert.
10. Click Save and then click Run to run the bot.

If all fields are extracted, and the value has a high confidence, the system sends the successfully extracted data to the output folder, specified during learning instance creation, and the **Success** sub folder for successfully processed documents; while failed documents are sent to a different folder for validation. The status of the data extraction is updated in Bot Insight and is reflected in the Learning Instance page.

Using Validation action

Use the Validation action to dynamically generate the form for validating a document against the learning instance.

This action initiates a verification process for the specified learning instance.

1. Navigate to Control Room > Bots > My Bots, and click Create new > Bot.
2. In the Create Task Bot window, add a name, description (optional), and specify the folder to save the bot.
3. Click Create & edit to create a bot.
The Edit Task Bot window appears with your bot displayed.
4. From the Actions palette, double-click or drag IQ Bot (Preview) > Validation action into your workflow.
5. In the right-side pane, select the learning instance from the drop-down list.
6. Click Save, and then click Run to run the bot.

The system displays an interactive form with a document and extracted data for validation.

IQ Bot Classifier package

Use the IQ Bot Classifier package to group or classify documents into appropriate learning instances for content extraction in IQ Bot A2019.

Contact your Automation Anywhere Customer Success Manager (CSM) or Partner Enablement Manager (PEM) to request this package.

Actions in the IQ Bot Classifier package

The package contains the Train Classifier and Classify actions. You can use these actions to create a model file, and use the file to classify uploaded documents into different folders. These actions work as a precursor to document processing.

The Classify action groups the document pages into various categories, making it is easy for you to send each classified group for document processing and ensuring the documents are not placed in unclassified output folders.

Actions	Description
Train Classifier	See Using Train Classifier action on page 669
Classify	See Using Classify action on page 670

Using Train Classifier action

Use the Train Classifier action to create a model file that is used by the Classify action to sort the documents into required categories for input.

Ensure the action meets the following minimum requirements:

- Has at least two categories or subdirectories.
- A minimum of 15 pages per category (20 pages recommended).

If these minimum requirements are not met, an error message is displayed during bot runtime.

1. In the Actions palette, double-click or drag the Train Classifier action from the IQ Bot Classifier package.
2. Select the input folder path from Desktop folder or Variable.



Note: The input folder path must have subdirectories with the names that correspond to the category of the documents that you want to train the classifier on. For example, if you have sales-related documents, the input folder path must have subfolders such as *Invoice* and *Purchase Order*.

3. Optional: If you select Desktop file, click Browse to change the default filepath.
4. Enter a name for the model file in the Model name field.
5. Use the Model output path field to select the directory for the output model file.
6. Optional: Configure the following ADVANCED SETTINGS:
 - a) Training Optimization: Use the drop-down menu to select the type of training optimization.
 - Precision: select this option when you want your training model to be precise but can miss out on few documents.
 - Recall: select this option when you want the training model to find all the relevant cases within a dataset.
 - F1 score: is selected by default and the recommended setting as it combines the training optimization of both Precision and Recall.

F1 score is the selected by default. Precision and Recall.
 - b) Classification Type: Use the drop-down menu to select the features you want to include such as text, image, or both.

Text and image is selected by default.
 - c) OCR Settings: The Extract all text blocks and Extract text from images are enabled by default.
7. Click Save.

A model file is created in the directory specified using the Model output path field.

Using Classify action

IQ Bot Classify action groups the input document into various categories based on the selected model file that is created using IQ Bot Train Classifier action.

As multi-page documents in *.tiff* format are not supported in the Classify action, ensure that these are converted to *.pdf*. Note that multi-page *.tiff* documents are supported for training.

1. In the Actions palette, double-click or drag the Classify action from the IQ Bot Classifier package.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Click Browse to change the default filepath.
4. Click Classifier to select the filepath of the model file or click Browse to change it.
5. Use the Output folder path option to save the classification output document.

The pages from the output document are saved in the respective subfolders based on the categories created in the model file.
6. Optional: Configure the following ADVANCED SETTINGS:
 - Confidence threshold (%): If the confidence value of the category prediction of a page is less than the confidence threshold, it is moved to the *Unclassified* folder.
 - Save classification output variable: Save the classification results as a list of dictionaries with the following keys:
 - fileName
 - pageIndex
 - category

- confidence

IQ Bot [Local Device] package

Use the IQ Bot [Local Device] package to leverage your existing pool of RPA devices and process documents using multiple Bot Runners, without having to manage a separate IQ Bot cluster setup.



Note: This package is available on demand for On-Premises users. You have to upload this package to Enterprise A2019 and enable the action. For cloud users, it will be available as a pre-installed package.

[Add packages to the Enterprise Control Room](#) on page 1098

Contact your Automation Anywhere representative to request for the IQ Bot [Local Device] package.

Before you start

IQ Bot [Local Device] package helps you scale by processing documents on multiple devices simultaneously using a device pool. You can set this up using workload management (WLM) in the Enterprise Control Room.

[Workload management](#) on page 1079

- If you are using a device pool, then you have to set up a shared file system so that all the Bot Runners can process and store documents at the same location.
- This command performs parallel processing at the folder level, so you have to set up input files in separate folders.
- You must have the IQ Bot Services role along with the Bot Runner role to run bots in production. This is required so that the Bot Runner can access the IQ Bot server when using a device pool.
- The package does not create new groups and the documents that do not match the existing groups are sent to IQ Bot Validator on the IQ Bot server.

Actions in the IQ Bot [Local Device] package

The package includes the following action:

Action	Description
Process Documents	See Using Process Documents action on page 671

Using Process Documents action

Use the action to process documents using TaskBots created in the Enterprise Control Room.

1. In the Actions palette, double-click or drag the Process Documents action from the IQ Bot [Local Device] package.
2. In the right-side pane, select the learning instance from the drop-down list.
You can click the refresh option to view the updated list.
Only the ABBYY FineReader Engine and Tesseract4 OCR engines are currently supported.
3. Enter the Input documents folder path.

- Enter the folder path as text or choose a folder using the Browse option.
 - Either enter a variable name or click Variable to select a variable from the list.
4. Enter the Output folder path path.
 - Enter the folder path as text or choose a folder using the Browse option.
 - Either enter a variable name or click Variable to select one from the list.
 5. Select the Validator settings check box if you want to review documents in the IQ Bot Validator.
 When you enable this setting, documents are stored in the IQ Bot server's output path. To download documents back to your local device, use the Download all documents action in the IQ Bot package.

[Download all documents action](#) on page 678

The following types of documents are sent to the IQ Bot Validator:

- Failed documents (exceptions)
- Unclassified documents
- Documents that do not belong to any group



Note: If you do not want to use the IQ Bot Validator, do not enable this setting. You can build your own Validator using Interactive forms and the dashboards on Bot Insight.

[Using interactive forms](#) on page 931

6. Click Save.

IQ Bot Pre-processor package

Use the IQ Bot Pre-processor package to extract content from documents or process image files before they are sent to IQ Bot A2019.



Note: The IQ Bot Pre-processor package is not available as part of the standard IQ Bot A2019 installation. Go to the Automation Anywhere support site to download and install the package: A-People Downloads page (Login required).

You have to upload this package to Enterprise A2019 and enable the action.

[Add packages to the Enterprise Control Room](#) on page 1098

After installation, you can locate the package in the Enterprise Control Room: Bots > Packages > All packages list in A2019.

Ensure that the Windows Media Foundation platform is installed on your Bot Runner machine in order to use the following commands without any errors.

Actions in the IQ Bot Pre-processor package

The following table lists the actions used for processing image file:

Actions	Description
Concatenate image	See Using Concatenate images action on page 673
Convert image to pdf	See Using Convert image to pdf action on page 673

Actions	Description
Edit image	See Using Edit image action on page 674
Enhance image	See Using Enhance image action on page 675
Orient image	See Using Orient image action on page 676

The following table lists the actions used for extracting content from documents:

Actions	Description
Get barcodes	See Using Get barcodes action on page 674
Get document info	See Using Get document info action on page 675
Get page content	See Using Get page content action on page 675

Using Concatenate images action

Use the Concatenate images action in the IQ Bot Pre-processor package to link two image files.

1. Drag the IQ Bot pre-processor > Concatenate images action into your workflow.
 2. Use the Input file path 1 field to select the first input file from Control Room file, Desktop file or Variable.
 3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
 4. Use the Input file path 2 field to select the second input file.
 5. Select the output folder from the Output Path field.
 6. Optional: Click Browse to change the default output filepath.
 7. Use the Concatenate Type field to select one of the following options:
 - Vertical: To vertically concatenate or link the selected images.
 - Horizontal: To horizontally concatenate or link the selected images.
 8. Optional: Use the Assign output status to variable field to set the output status of action during bot runtime.
 9. Click Save.
- When the bot runs successfully, the combined image file is saved in the specified output folder.

Using Convert image to pdf action

Use the Convert image to pdf action in the IQ Bot Pre-processor package to convert a selected image file to a text-enabled PDF document. The converted PDF file retains the name of the input image file by default.

1. Drag the IQ Bot pre-processor > Convert image to pdf action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Use the Output Path field to select the output folder for the PDF document.
5. Optional: Click Browse to change the default output filepath.
6. Optional: Choose from the following advance settings:
 - Input file settings: Use this field to select various input file settings.

For example, if the input file is a legal document (a bank check), select the Has MICR check box.

- Process settings: Use this field for processing the output file.

For example, select the Process text blocks independently check box if the OCR engine must process various blocks of the input file as a specific text type.

7. Optional: Use the Save the output status of the action as boolean to set the output status.
8. Click Save.
When the bot runs successfully, the processed PDF file is saved in the specified output folder.

Using Edit image action

Use the Edit image action in the IQ Bot Pre-processor package to resize an image file.

1. Drag the IQ Bot pre-processor > Edit image action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Use the Output Path field to select the output folder.
5. Optional: Click Browse to change the default output filepath.
6. Use the Select Image Edits drop-down menu to select one of the following options:
 - Crop: Use an auto-crop or manual option to crop the image.
 - Resize: Change the height and width of the image.
7. Optional: Use the Assign output status to variable field to set the output status of action during bot runtime.
8. Click Save.
When the bot runs successfully, the edited image file is saved in the specified output folder and is suffixed by the word processed.

For example, if the image filename is Sales.png, the processed file is saved as Sales_processed.png

Using Get barcodes action

Use the Get barcodes action in the IQ Bot Pre-processor package to detect and extract all available barcodes from a document.

1. Drag the IQ Bot pre-processor > Get barcodes action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Use the List of dictionaries with 7 keys drop-down menu to select the output format for the extracted strings.

If the document has multiple barcodes, multiple dictionaries are used as each dictionary corresponds to a single barcode. Each dictionary has the following seven keys that relate to the various attributes of the barcode in a document:

- Page number of the document where a barcode is available
- Type of the barcode
- Value of the barcode
- X and Y coordinates of the barcode.
- Width of the barcode

- Height of the barcode
5. Click Save.
When the bot runs successfully, the document with the extracted barcodes is displayed.

Using Get document info action

Use the Get document info action in the IQ Bot Pre-processor package to extract document information such as the page count and extension type.

1. Drag the IQ Bot pre-processor > Get document info action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Use the Dictionary object with 5 keys drop-down menu to select the output format for the extracted strings.
If the document has multiple barcodes, multiple dictionaries are used as each dictionary corresponds to a single barcode. Each dictionary has the following five keys that relate to the various attributes of the barcode in a document:
 - Filepath of the document location
 - Extension type of the document
 - File type of the document
 - Total number of pages in the document
 - File size of the document
5. Click Save.
When the bot runs successfully, all the extracted information for the selected document is displayed.

Using Get page content action

Use the Get page content action in the IQ Bot Pre-processor package to extract text from a specific page of a document (PDF, image file) into a list of strings.

1. Drag the IQ Bot pre-processor > Get page content action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Enter the page number of the selected document from which the content must be extracted.
5. Use the List of strings extracted from page drop-down menu to select the output format for the extracted strings.
6. Click Save.
When the bot runs successfully, the content extracted from the specific page of the selected document is displayed.

Using Enhance image action

Use the Enhance image action in the IQ Bot Pre-processor package to enhance a selected image file.

1. Drag the IQ Bot pre-processor > Enhance image action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. Optional: If you selected Control Room file or Desktop file, click Browse to change the default filepath.
4. Use the Output Path field to select the output folder.

5. Optional: Click Browse to change the default filepath.
6. Click the Add effect for additional effects.

For example, if you want to enhance an image:

- Select Effect type > SHARPEN.

Additional fields such as Gaussian blur, Alpha, Beta and Gamma are displayed.

- Enter 5 in the Alpha field.

Value between 0 to 10 can be used in the additional fields, with higher value for better enhancement. Optionally, you can also press F2 or click Insert a value option to select a system value.

The selected enhancement options are listed in the Effect type field, and you can edit or delete a specific effect type.

7. Click Add.
8. Optional: Use the Assign output status to variable field to set the output status of action during bot runtime.
9. Click Save.

When the bot runs successfully, the enhanced image file is saved in the specified output folder.

Using Orient image action

Use the Orient image action in the IQ Bot Pre-processor package to change the orientation of a selected image file.

1. Drag the IQ Bot pre-processor > Orient image action into your workflow.
2. Select the input file from Control Room file, Desktop file or Variable.
3. For the Control Room file and Desktop file tabs, click Browse to change the default filepath.
4. Use the Apply settings field to change the following orientation options:
 - Flip: Use the drop-down menu to flip the image horizontally, vertically, or horizontally and vertically.
 - Rotate: Use the drop-down menu to:
 - Rotate the image clockwise or anti-clockwise.
 - Change the angle of the image.

For example, enter 45 if you want to change the image angle by 45 degrees.

5. Click Save.

When the bot runs successfully, the modified image file is saved in the specified output folder.

IQ Bot Extraction package

IQ Bot Extraction package **automatically** extracts values from invoices using a pretrained model, the setup time is lower and training is optional. However, you can improve the extraction accuracy by providing additional training. The package uses Bot Runners on your local device instead of an IQ Bot server for processing.



Note: This package is not available as part of the standard IQ Bot A2019 installation. Go to the Automation Anywhere support site to download and install this package: A-People Downloads page (Login required).

You have to upload this package to Enterprise A2019 and enable the action.

[Add packages to the Enterprise Control Room](#) on page 1098

Verify the following important requirements for this package:

- You must have installed and configured IQ Bot A2019 On-Premises Build 7553 or later.
- You must have a learning instance created to use this package.



Note: Train only the documents that have the most common layouts. Training other groups is not necessary as they can be extracted by pretrained model. It is important to select an existing group for default validation rules to avoid documents with errors in the Success folder.

[Edit a learning instance](#)

- Only the learning instances created using ABBYY FineReader Engine 12.4 and Tesseract4 OCR are used.

Action in the IQ Bot Extraction package

The following table has the action used for extracting values from invoices:

Action	Description
IQ Bot Extraction	See Using IQ Bot Extraction action on page 677

Using IQ Bot Extraction action

Use the IQ Bot Extraction package **to** extract values from invoices using a pretrained model.

1. Drag the IQ Bot Extraction action into your workflow.
2. Use the Learning instance name drop-down menu to select a learning instance.
Ensure you have created a learning instance.
3. Select one of the following tabs for the input documents:
 - Desktop folder: Enter the folder path as text browse and choose a folder.
 - Variable: Enter a variable name or browse to select a variable from the list.
4. Select the folder (instead of a single document) that has all the documents that must be processed.
5. Select the output folder from the Output folder path field.
6. Optional: Select the Send documents to IQ Bot Validator for validation check box.
Although the documents are processed using Bot Runners on your local machine, you must use this option if you want to validate the documents in the IQ Bot Validator.
7. Click Save.

After the TaskBot is run, the output folder can have up to four subfolders:

- Success: Contains documents that the package successfully extracted all the fields from and appear as .csv files.
- Validation: Contains documents that require validation.

The documents appear as .csv files and you can use the IQ Bot Validator to validate these documents.

- Retrain: Contains documents that were sent for validation.

These documents are stored in their original input format and you can train them by uploading them to your existing learning instance. The package does not create new groups. To create new groups

and train the failed documents, use the Upload option to send the documents from the Output \Retrain folder to your learning instance. The groups are created based on the Groups Creation Threshold defined in the learning instance.

- Unprocessed: Contains documents that were not processed due to runtime errors.

These documents are stored in their original input format and you can process them using the IQ Bot Extraction package.

If you use the IQ Bot Validator, the validated files are stored on the IQ Bot server output folder. Use the IQ Bot: Download all documents action to download files to your output folder on the local device.

IQ Bot package

The IQ Bot package enables you to upload and download documents from an IQ Bot server.

Actions in the IQ Bot package

The IQ Bot package includes the following actions:

Action	Description
Download all documents	See Download all documents action on page 678.
Upload document	See Upload document action on page 679.

Download all documents action

Use the Download all documents action to download the extracted results from an IQ Bot server that were created by running a Bot with the Upload Document action.

IQ Bot extracts fields from documents and exports them as CSV files. This action can also download any unclassified, untrained, and invalid documents to your local directory.

Follow these steps to download extracted results from the IQ Bot server:

1. In the Actions palette, double-click or drag the Download all documents action from the IQ Bot package.
2. In the Learning instance name field, select the name.
3. In the Local output folder field, provide a path to your local folder.
4. In the Document status, select the appropriate status for the documents.
 - Success: Documents have been processed and are in .CSV format.
 - Invalid: Documents were marked as invalid during the validation process.
 - Unclassified: Documents could not be classified.
 - Untrained: Documents were classified into new groups during processing and require training.
5. In the Delete files from the server after downloading check box, select the option to delete documents.
6. Optional: In the Save the response to a variable field, add a variable. For example, select prompt-assignment - string from the drop-down list.
A variable value in this field provides information on whether the download was successful or failed, and the reason for the failure.
7. Click Update.
8. Click Save.

9. Click Run now.
10. Click Close.



Note: If the download fails, verify the variable value using a Message Box or Log to File action. See the Save the response to a variable description.

11. Navigate to the local output folder to review the downloaded files.

Upload document action

The Upload Document action enables you to upload a document with IQ Bot. IQ Bot extracts fields from the document and exports them to CSV files.

- Gain access to an Enterprise Control Room.
- Ensure your local host is a registered device in the Enterprise Control Room.

Use the Upload Document action to upload a single document to the Enterprise Control Room.

Follow these steps to upload a document:

1. In the Actions palette, double-click or drag the Upload Document action from the IQ Bot package.



Note: A file size of 50 MB is supported for the upload action.

2. In the Learning instance name field, select the name.
3. In the File path field, specify the location or type of the file.
4. Optional: In the Save the response to variable field, add a variable. For example: select prompt-assignment - string from the drop-down list.
A variable value in this field provides information about the file upload process: if the upload was successful or failed, and the reason for the failure.
5. Click Apply.
6. Click Save.
7. Click Run now.
8. Click Close.

To upload multiple files, see [Upload multiple files with IQ Bot using Loop action](#) on page 679.

Upload multiple files with IQ Bot using Loop action

You can upload multiple files by adding a Loop action to the Upload Document action in the Bot editor.

Follow these steps to upload multiple documents:

1. In the Actions palette, double-click or drag the Loop action from the Loop package.
See [Loop package](#).
2. In the Loop Type field, select the Iterator option.
3. In the Iterator field, select For each file in folder from the drop-down list.
4. In the Folder path field, select the folder path.
5. In the Assign file name and extension to this variable field, specify the variable name and value.
For example, if the variable name is filename, this variable is used to store file names of the chosen folder. Select the value filename - Dictionary of Strings.
See [Dictionary package](#).
6. Click Apply.
7. In the Actions palette, double-click or drag the Upload Document action from the IQ Bot package.
8. Complete the information, except the File Path field.

9. In the File path field, enter a dynamic file path using a variable.
 - a) Add a file path pointing to the folder: `C:\input\`.
 - b) Add the dynamic file name string: `$filename (name) $. $filename (extension) $`.

The name and extension keys are predefined. When inserted and run in a loop, the action iterates through the entire folder and calls all files in the folder one at a time. The File path value looks like this: `C:\input\$filename (name) $. $filename (extension) $`

10. Click Apply.
11. Click Save.

To read results from variable, use the Message box action.

JavaScript package

The JavaScript package contains actions to run a JavaScript from a bot. These actions can run JavaScript on Windows, Linux, and UNIX based devices.

Before you start

1. Open a JavaScript file, or specify the script you want to run using the Open action. You must associate the details of the file or script you want to run with a session name. Use this same session name for other JavaScript actions.
2. Use the Run JavaScript action to run a function within a script or an entire script. You must use the same JavaScript session name established in the Open action.
3. Close the JavaScript session after running the script.

To review the bot launcher logs, navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip`. Each zipped folder contains a file with data on the code execution, which is useful for debugging.

Actions in the JavaScript package

The JavaScript package includes the following actions:



Note: If you built a bot using actions from the JavaScript package from Build 5322 or earlier, the actions will be missing when you open the bot with the default package version. You must reinsert the actions and repopulate the fields.

Action	Description
Close	Closes the session. Specify the same session name from the Open action.

Action	Description
Open	Opens a JavaScript file. - In the JavaScript session field, specify a session name. Use this same session name for other JavaScript actions. - Choose one of the following options: - In the Import existing file option, select an existing JavaScript file.  Note: If you are uploading a script from a file on your desktop, the file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded. - In the Manual input option, enter the JavaScript.
Run JavaScript	Runs a function within the JavaScript. - In the JavaScript session field, specify a session name. Use the same session name from the Open action. - Optional: Specify the function name to run and the arguments to pass to the function.  Note: You can pass only a list variable as an argument for the function. You can use the list variable to pass multiple arguments of different data types such as Boolean, datetime, number, and string. - Optional: In the Assign the output to variable field, specify the variable.

Resources

To learn more, see [Training - Write inline scripts in a bot](#). This course introduces you to writing inline scripts within a command.



Note: You must log in with a registered A-People Community [account](#) to access course.

Legacy Automation package

The actions in the Legacy Automation package are only used in migrated bots to ensure that they run seamlessly in Enterprise A2019. We do not recommend using this package for new bot development.



Note: If you built a bot using actions from the Legacy Automation package from Build 5322 or earlier, the actions will be missing when you open the bot with the default package version. You must reinsert the actions and repopulate the fields.

Expressions

Expressions appear in action input fields. This package has the following expressions:

Expression	Description	Use example
DictionaryToString	Converts a dictionary variable to a string variable	<pre>{{ \$dictionaryVar.LegacyAutomation:dictionaryToString \$ }}</pre> The output is a string variable with the following value: {key1,value1},{key2,value2}
GetBotPath	Modifies the value of the bot path variable in the 11.x or 10.x bots and replaces it with the relative bot path according to the Enterprise A2019 repository.	
GetDecrementedListIndex	Decrements the value of the respective variable by 1. It is used mostly in the index positions of list, record or table variables.	<pre>\$myArray[\$Loop-Counter-1.LegacyAutomation:getDecrementedListIndex \$] [0] \$</pre> The output of myNumber decreases by 1 with each iteration of the loop.
GetIncrementedListIndex	Increments the value of the respective variable by 1. It is used mostly in the index positions of list, record or table variables.	<pre>\$Loop-Counter-1.LegacyAutomation:getIncrementedListIndex \$</pre> The output of myNumber increases by 1 with each iteration of the loop.
GetKeystrokeCount	Calculates the values of keystrokes in a phrase/text  Note: A special character, such as [TAB], [END], or [PAGE DOWN], is counted as one keystroke.	<pre>\$KeyStroke-CharLength.LegacyAutomation:getKeystrokeCount \$</pre> The output is the average delay for each keystroke.
GetLegacyIndexValue	Retrieves the value from the specific index position of the list variable in the bots migrated from 11.x or 10.x. If the index position is greater than the size of the list variable, the system retrieves the value from the first index position of the list in the migrated bots	
ListToString	Converts a list variable to a string variable.	<pre>{{ \$listVar.LegacyAutomation:listToString \$ }}</pre> The output is a string variable with the following value: value1,value2,value3
ListToTable	Converts a list variable to a table variable.	<pre>{{ \$my-list-variable.LegacyAutomation:listToTable \$ }}</pre> The output is a table variable where each list value is cell in a single column.

Expression	Description	Use example
ParseLegacyKeys	Ensures that the Insert Key Stroke command of the 10.x/11.x bots stored in variables is successful upon execution. This expression converts them into equivalent A2019 key strokes during the execution.  Note: The appearance of some special characters differs between Version 11.3 and Enterprise A2019. For example, the Page Up key appears as [PAGE UP] in Version 11.3 and [PAGE-UP] in Enterprise A2019. This difference does not impact bot function.	<pre>\$Test.LegacyAutomation:parseLegacyKeys \$</pre>
ParseVariableOperation	Parses the expression provided in the 10.x/11.x Variable Operation command. This expression ensures that A2019 returns the same output as 10.x/11.x bots upon execution.	<pre>\$prompt-assignment.LegacyAutomation:parseVariableOperation \$</pre>
TableToString	Converts a table variable to a string variable. You can also use delimiters such as a colon, semicolon, or space to separate the values of the string variable in the output.	<pre>{{ \$tableVar.LegacyAutomation:tableToString }} \$}}</pre> The output is a string variable with the following value: {value1,value2},{value3,value4} Use a colon, semicolon, or space as <"delimiter">: <pre>{{ \$tableVar.LegacyAutomation:tableToString "delimiter" }} For example:</pre> <pre>{{ \$tableVar.LegacyAutomation:tableToString "delimiter" }} \$}}</pre> The output is a string variable with the following value: {value1:value2}: {value3:value4}
TableToList	Converts a table variable to a list variable.	<pre>{{ \$dataTable.LegacyAutomation:tableToList }} For example: {{ \$dataTable.LegacyAutomation:tableToList }} \$}}</pre> The output is a list variable with the following value: [value1,value2,value3]

List package

The List package contains actions that enable you to perform various operations on a variable of the list data type.

Working with variables of list data type

A list is a collection of ordered values. The values can be of Boolean, number, or string data subtype. When initializing a list variable, you can select the Any data subtype in order to hold any of the three data subtypes. You can manually enter values by creating a new variable or selecting an existing one from the Variables menu, and then clicking Add.

Common uses of list variables include:

- Sending an email to multiple recipients.
- Searching multiple web addresses.

Actions in the List package

If you are using a List action in a Loop action, you must use the For each item in the list iterator.

The following actions are available in the List package:

Action	Description
Add item	Inserts an item into a list variable. You can choose to add the item at the end of the list or specify a position in the list. • Select the list variable in which to add an item from the List variable list. • Select the variable that contains the value to add from the Item to be added list.  Note: The variable must be of the same sub-data type as the other list items. • Select the To end of list option to insert the item at the end of the list or select At list index to specify the index in the list where to insert the item. The list index starts from 0. The first item in the list is at position 0, the second item at 1, and so on. For example, to add an item at the fourth position in a list, enter 3 in the At list index field.
Assign	Assigns the value of the source list to the destination list variable. • Select the source list variable from the drop-down list or create a new list variable. • Select a list variable or create one to hold the output.
Clear	Clears all items from the selected list variable.

Action	Description
Get item	Retrieves a value at the specified position in a list and stores the output to a variable. • Select the list variable from which you want to retrieve a value from the List variable list. • Specify the position in the list from where you want to retrieve the value in the Index number field. The list index starts from 0. The first item in the list is at position 0, the second item at 1, and so on. • Select a variable that you want to use to store the output from the Assign the output to variable list.
Join items	Combines all the available values in a list variable and stores the output to a string variable. You can specify the delimiter you want to use as a separator in the output. • Select the list variable that you want to use from the List variable list. • Specify the delimiter you want to use to separate values in the output in the Delimiter field. • Select a variable that you want to use to store the output from the Assign the output to variable list.
Remove item	Removes an item from a list and assigns the output to a variable. • Select the list variable from which you want to remove an item from the List variable list. • Specify the position in the list from where you want to remove the value in the Index number field. The list index starts from 0. The first item in the list is at position 0, the second item at 1, and so on. • Select a variable that you want to use to store the output from the Assign the output to variable list.
Set item	Sets an item at the specific position in a list and stores the output in a variable. • Select the list variable in which you want to set a value from the List variable list. • Specify the position in the list where you want to set the item in the Index number field. The list index starts from 0. The first item in the list is at position 0, the second item at 1, and so on. • Select a variable that you want to use to store the output from the Assign the output to variable list.
Size	Retrieves the number of items in a list and assigns the output to a number variable. • Select the list variable for which you want to retrieve the size from the List variable list. • Select a number variable that you want to use to store the output from the Assigns the number of items to variable list.

Related reference

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[Variables overview](#) on page 866

Enterprise A2019 offers a variety of variables, each designed to hold specific types of data and is intended for specific use. Use the topics below to learn more about each variable and how to use them.

Log To File package

Use the Log To File package to create a log file with data.

The Log To File package enables the following:

- Verify that a bot ran properly.
- Create a new log file.
- Specify custom text to be included in the log file.
- Add a time stamp to the log file.
- Use a log file as a variable.



Note: The package supports ANSI, Unicode, and UTF8. It can save files as .csv and .txt.

Actions in the Log To File package

The Log To File package includes the following action:

Action	Description
Log to file	See Using Log To File action on page 686.

Using Log To File action

Using the Log To File action, you can create a log file with data about the events that occur when a TaskBot runs.

Follow these steps to log text into a file:

1. In the Actions palette, double-click or drag the Log To File action from the Log To File package.
2. In the File path field, specify the file location or variable.
3. In the Enter text to log field, enter the text to log in the file.
4. Select the Append timestamp check box to add a time stamp.
5. In the When logging field, choose Append to existing file to append the log file or Overwrite existing log file to overwrite the content in the log file.
6. Select the Encoding type.
 - ANSI: Used to encode Latin alphabet.
 - UNICODE
 - UTF8: Can encode all possible characters.
 - UTF-16LE: Inserts a byte order mark (BOM) Unicode character at the beginning of the file.



Note: Shift-JIS files must use ANSI as encoding to read text file content.

If you selected the Append to existing file option in Step 5, ensure that the selected encoding type matches that of the original file, otherwise some of the characters might not be logged.

7. Click Save.

Loop package

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

The Loop package enables you to repeatedly run specific actions within a bot. For example, repeat the set of actions that read data from each row of a Microsoft Excel file, rename all files in a folder, and save each email in a mailbox. You can also use the If action within the Loop action to validate a condition, and based on the outcome of it, skip the current iteration in the loop or even break the loop.

For conditional loops, different actions are taken depending on whether the conditional parameters are met. For loops that have a specified number of iterations, the loop exits on the last iteration and goes to the next step in the bot.

Actions in the Loop package

The following Loop actions are available:

Action	Description
Loop	Repeats the action for a specific number of times based on the option selected from the Iterator list, or until the condition is met based on the option selected from the Condition list. See Using Loop action on page 692.
Continue	Use the Continue action along with the If action to skip the current iteration and continue with the next iteration in the loop based on the condition you have specified in the If action. See If package on page 656.
Break	You can use the Break action along with the If action to terminate the loop based on the condition you have specified in the If action. When you terminate the loop, the actions immediately following the Loop action run. See If package on page 656.

Iterator-related conditions within the Loop action

Select the Iterator option to specify the number of times the set of actions will be repeated as part of the Loop action:

Iterator	Description
For each row in CSV/ TXT	Repeats the set of actions for each row in the specified CSV or text file and assigns the values in the current row to a record variable. See Using the For each row in CSV/TXT iterator on page 693.
For each row in Data Table	Repeats the set of actions for each row in the specified table and assigns the values in the current row to a record variable. See Using the For each row in table iterator on page 694.

Iterator	Description
For each row in a SQL query dataset	Repeats the set of actions for each row in the specified SQL query dataset and assigns the values in the current row to a record variable. Provide the session name that you have used to establish a connection with the database.
For each key in the Dictionary	Repeats the set of actions for each key in the specified Dictionary variable and assigns the name of the current key to a variable.  Note: When a bot runs a Loop action that contains a Dictionary > Put action, the bot only iterates on the original number of items in a dictionary; it ignores items inserted using the Put action.
For each value in the Dictionary	Repeats the set of actions for each value in the specified Dictionary variable and assigns the current value to a variable. Because this variable type can hold various subtypes (String, Number, Boolean, and so on), if you quick-create a variable when configuring the action, the variable is of Any type.  Note: When a bot runs a Loop action that contains a Dictionary > Put action, the bot only iterates on the original number of items in a dictionary; it ignores items inserted using the Put action.
For each mail in mailbox	Repeats the set of actions for each email in the specified mailbox. See Using the For each mail in mail box iterator on page 596.
For each row in worksheet (Excel basic or Excel advanced)	Repeats the set of actions for each row that contains data in a worksheet and assigns the values in the current row to a record variable. Provide the session name that you have used to open the Excel basic or Excel advanced worksheet. Specify whether to repeat the actions for all the rows, specified rows, or a specified cell range. Select a record variable from the Assign the current row to this variable list or create a new one. See Record variable on page 875. This iterator retrieves cell values as string data types. It supports Excel cell formats, including Number, Percentage, Currency, Scientific, and Date. For example, a value from a cell of Currency formatting retains the currency symbol when passed to a table or record variable. - You must convert the values to perform non-string operations. - In Excel advanced, when you choose loop iterator as For each row in worksheet, you have a Read option to read either the visible text or value of the cell. For example, if the cell has 70% as cell content, Read cell value option will read the value as 70 ignoring the % format whereas Read visible text option will read the content as 70%.  Recommendation: Use the Read cell value option as reading value from a cell for better performance than reading visible text.
For each file in folder	Repeats the set of actions for each file in the specified folder and assigns the properties of the current file to a Dictionary variable containing two keys: the <code>name</code> key holds the file name and the <code>extension</code> key holds the file extension.

Iterator	Description
For each folder in folder	Repeats the set of actions for each folder in the specified folder and assigns the current folder name to a String variable.
For each item in the list	Repeats the set of actions for each item in the specified list and assigns the current item to a variable. Specify whether to repeat the action for all items in the list or only for the range of items in the list. Because this variable type can hold various subtypes (String, Number, Boolean, and so on), if you quick-create a variable when configuring the action, the variable is of Any type.  Note: The index in a list starts from zero. For example, to repeat the action for items from the third position to the sixth position of the list, specify 2 and 5 in the appropriate fields.
For n times	Repeats the actions in the container the specified number of times. You can assign the iteration count to a Number variable.
For each value in record	Repeats the actions for each value in the specified record and assigns the current value to a variable. Because this variable type can hold various subtypes (String, Number, Boolean, and so on), if you quick-create a variable when configuring the action, the variable is of Any type..
For each meeting in calendar	Use this option to repeat the set of actions for each meeting in the specified calendar. See Using Office 365 Calendar actions in a loop on page 708.
For each row in worksheet (Office 365 Excel)	Repeats the set of actions for each row that contains data in a worksheet. • Provide the session name that you have used to open the worksheet. • Specify whether to repeat the actions for all the rows or specific rows. • You can assign the values in the current row to a record variable.
For each node in a XML dataset	Repeats the set of actions for each node in an XML dataset and assigns the current node to String variable. Provide the session name that you have used to open the XML file.

While related conditions in the Loop action

You can configure multiple while related conditions within a single Loop action:

1. Click Add condition.
2. Select either of the following options:
 - And: Both of the conditions must be met for the actions to run.
 - Or: Either of the conditions must be met for the actions to run.
3. Select the conditions from the drop-down list.

Select the While option to use the following conditions:

While	Description
Application	Use the Application is not running or Application is running condition to execute actions based on whether an application is running or not running. Enter the application path or specify the path using a variable along with the amount of time to wait (in seconds) for the condition to be true.
Boolean	Use this condition to execute actions based on the value of a Boolean variable. Use this condition to compare the values of two Boolean variables or one Boolean variable to a selected Boolean value.
Data table	Use the Data table is empty condition to execute actions based on whether the specified table contains values. Use the Number of rows and Number of columns conditions to execute actions based on whether the number of columns or rows is Equal to, Greater than, or Less than the specified value.
Datetime	Use the Datetime variable condition to execute actions based on whether the value of the source datetime variable is Equal to or Not Equal to, is Greater than or Equal to, or is Lesser than or Equal to the value of the target datetime variable.
Dictionary	Use this condition to repeat the set of actions based on whether the selected dictionary variable contains the specified key.  Note: The key comparison is case-sensitive.
File	Use the following conditions to execute the action: - File date Use this condition to verify the date and time that the specified file was created or modified. Specify a date range using the Is within last, Is between, or Is before options. For the Is within last option, specify the number of days or time (in hours, minutes, and seconds). Enter the amount of time (in seconds) to wait for this condition to be true. - File exists and File does not exist Use these conditions to execute an action based on whether a file exists. For example, if a data file exists, format the file and upload it to a database. - File size This condition verifies if the specified file is larger, smaller, not the same, or the same as the size you specify. Enter the amount of time (in seconds) to wait for this condition to be true.
Folder does or does not exist	Use these conditions to repeat the set of actions based on whether a folder exists.

While	Description
Image Recognition	Use these conditions to verify whether: - Image file is found in the Image file or not. - Image file is found in the Window or not. - Window is found in the Image file or not. - Window is found in the Window or not. For the Window conditions, you can use the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.  Note: This option is only available for windows that can be resized. It is not available for Desktop or Taskbar options.
JavaScript	Use the Script is successful or Script is unsuccessful condition to execute actions based the status of the specified JavaScript. Select the file that contains the script and optionally specify the parameters by selecting a list variable.
Legacy automation	The Legacy automation conditions are only used in migrated bots to ensure that they run seamlessly in Enterprise A2019. We do not recommend using these conditions for new bot development. The following conditions to verify the following: - Whether Web control exists or not. - Whether Window control exists or not. - Whether Window control is active or not. - Whether Script is successful or not. - Whether Child window exists or not. For the Window control conditions, you can use the Resize window option to specify the window dimensions. This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.
List	Use the List variable condition to execute actions based on whether the specified list variable contains a particular value. The value can be of Number, String, or Boolean data type.
Number	Use the Number variable condition to execute actions based on whether the specified number variable is Equal to or Not Equal to, or is Greater than or Equal to, or is Lesser than or Equal to a particular value.
Ping	Use the Ping is successful or Ping is unsuccessful condition to verify if a machine or server is running, and execute actions based on the result. Enter the amount of time (in seconds) to wait for the condition to be true.
Recorder	Use this condition to detect an Object in a window. Select a window or variable to capture the object. Enter the amount of time (in seconds) to wait for this condition to be true.
Service	Use the Service is running or Service is not running condition to execute actions based on whether a service is running or not. Select Service list to choose a service from the list of available services.

While	Description
String	Use the String variable condition to execute actions based on whether the specified source string value is Equal to or Not equal to, or Includes or Does not include the target value. You can select the Match case option to only execute actions if the two strings have matching uppercase and lowercase letters. When you extract text from a Microsoft application, the extracted text contains the <code>/r/n</code> special characters which indicate a new line. Select the Ignore Carriage return option if you want to ignore the <code>/r</code> special character when you compare the text. To create a condition based on whether a string is empty or not empty, compare the source value to an empty target field using the Equal to operator. See Example of using a conditional statement on page 892.
Task Bot	Use the Task successful or Task unsuccessful condition to execute actions based on the status of the specified Task Bot.
VBScript	Use the Script is successful or Script is unsuccessful condition to execute actions based on the status of the specified Visual Basic script. Select the file that contains the script and optionally specify the parameters by selecting a variable.
Window	Use the Window exists or Window does not exist condition to verify if a specific application window is open by entering the Window title or using a variable. Enter the amount of time (in seconds) to wait for the condition to be true.

Related tasks

[Example of transferring data from CSV file to Excel worksheet](#) on page 895

In this example, you build a bot to update the product inventory in an Excel worksheet with new product names from a CSV file. Use actions from the CSV/TXT, Excel advanced, IF/ELSE, and Loop packages.

[Example of entering data into a web form from a worksheet](#) on page 890

In this example, you build a bot to enter multiple rows of data from an XLSX sheet into a web form. Use actions from the Excel advanced, Loop, and Recorder packages.

Related reference

[Record variable](#) on page 875

A record variable holds a row of data extracted from a database, spreadsheet, or table in name-field pairs. The fields can store values of Boolean, datetime, number, or string data type.

Using Loop action

Use the Loop action to repeatedly run a sequence of actions for a specific number of times or until a condition is met.

To repeatedly run a sequence of actions, do the following:

1. Double-click or drag the Loop action from the Actions palette.
2. Set the desired conditions for the loop.

Option	Action
Select the Iterator option to repeat the sequence of actions for a specific number of times.	Select an option from the Iterator list to specify how many times the sequence of actions is to be repeated. See Loop package on page 687 for the list of available options.
Select the While option to repeat the sequence of actions until a condition is met.	- Select an option from the Condition list to specify the condition. - Select the Check the condition at the end of the iteration to validate the condition at the end of each iteration. This option enables you to ensure that the set of actions run at least one time, even if the condition is not met.

- Double-click or drag the actions to be repeated within the Loop.
- Optional: Double-click or drag the Continue action from the Loop package to skip the current iteration and continue with the next iteration of the loop.
- Click Save.

Watch the following video on how to use the Loop action:

Using the For each row in CSV/TXT iterator

Use the For each row in CSV/TXT iterator in the Loop action to read the data of each row in a CSV or text file and assign the current row to a record variable. The bot reads the values in each cell as string-type values, even if there are numerical values.

First, open the CSV or text file. [Using the Open action for CSV/TXT file](#) on page 547

To use the For each row in CSV/TXT iterator in a Loop action, do the following:

- Double-click or drag the Loop action from the Loop package in the Actions palette.
- Select the For each row in CSV/TXT option from the Iterator list.
- Enter the name of the session that you have used to open the CSV or text file in the Open action.
- Select a record variable from the Assign the current row to this variable list or create a new one.



Note: If you select an existing record variable, ensure that the column headers capitalization in the CSV or text file match that of the schema of the record variable. [Schema](#) on page 875

Insert actions to use the values from the CSV or text file in your automation. Use the record variable to retrieve the values by index number or column name. For example, if the first column of the file is titled EmployeeID, to retrieve the value of the first cell of each row enter `$rYourVariableName[0]$` or `$rYourVariableName{EmployeeID}$`.



Note: You must select the Contains header option in the CSV/TXT > Open action to specify the record values by column name.

For an example, see [Build a Bot Insight dashboard bot](#) on page 904.

Using the For each row in table iterator

Use the For each row in table iterator in the Loop action to read the data of each row in a table variable and assign the current row to a record variable.

First, retrieve the table values and store them to a table variable.



Example: [Example of extracting data from a web table](#) on page 888

To use the For each row in table iterator in a Loop action, do the following:

1. Double-click or drag the Loop action from the Loop package in the Actions palette.
2. Select the For each row in table option from the Iterator list.
3. Select the variable that holds the values from the Table variable list.
4. Select a record variable from the Assign the current row to this variable list or create a new one.
5. Click Save.

Insert actions to use the values from the data table in your automation. Use the record variable to retrieve the values by index number or column name. For example, if the first column of the file is titled EmployeeID, to retrieve the value of the first cell of each row enter `$rYourVariableName[0]$` or `$rYourVariableName{EmployeeID}$`.

Message box package

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: **Web Form Filled and Complete**.

For more information, see [Using the Message box action](#) on page 694.

Use the following examples to learn how to use the Message box action when building automations.

- [Build a Go be Great bot](#) on page 886
Build a basic TaskBot using a Message Box action and a variable.
- [Build a basic bot that uses a desktop application](#) on page 887
An example of how to build a basic TaskBot that uses the calculator application.

Using the Message box action

Use the Message box action to insert a message box that shows a message when the task runs.

1. Double-click or drag the Message box action from the Message box package in the Actions palette.
2. Enter a window title for the message box.
3. Enter the message to display.

This field hold up to 65535 alphanumeric, character, and empty values.



Note: The single dollar sign (\$) is reserved for the Automation Anywhere back-end system. If you want to display a dollar sign (\$) in your message, you must enter two dollar signs (\$\$). For example, if you want to display the message, **Pay \$5.00**, that message must say **Pay \$\$5.00** in Enterprise A2019 for it to display properly to users.

4. Specify the number of lines at which to show a scroll bar.
5. Optional: Select the Close message box after option and specify the number of seconds after which the message box closes automatically.



Important: Select this check box if the bot will run on an unattended machine.

6. Click Save.

Microsoft LUIS NLP package

The Microsoft LUIS NLP package contains actions that enable you to connect to and consume the Microsoft Cognitive Services Text Analytics API to identify the language, sentiment, key phrases, and entities. This package supports the following languages: English, Chinese (Simplified), French, German, and Spanish.

Before you start

You must have an Azure Cognitive Services resource to use these actions. See [Create a Cognitive Services resource using the Azure portal](#).

You also require the following in order to use the actions:

- Service Endpoint URL: the endpoint URL that identifies the Azure service.
- Subscription Key: the unique key that authenticates Automation Anywhere Enterprise.

Actions in the Microsoft LUIS NLP package

Action	Description
Detect language	Identifies the language of the provided content and returns it in ISO 639-1 language code. The output is stored in a string variable.
Get key phrases	Identifies the main points and returns a list of key phrases. For example, if the input text is about a basketball game, this action returns the names of teams, the name of the venue, and the final score.
Get named entities	Identifies the entities in the provided content such as people, places, organizations, date/time, quantities, branded products, and book titles. The output is stored in a dictionary variable, where each name is a key, and the corresponding entity is the value.
Get sentiment	Analyzes the provided content and returns a sentiment and score. • If the score is greater than 0.6, the sentiment is Positive. • If the score is in the 0.2 through 0.6 range, the sentiment is Neutral. • If the score is less than 0.2, the sentiment is Negative. The output is stored in a dictionary variable containing two keys and their corresponding values: <code>sentiment</code> and <code>score</code> .

Mouse package

Use the Mouse package to simulate mouse actions.

Actions in the Mouse package

The Mouse package includes the following actions:

Action	Description
Click	See Using the Click action on page 696.
Move	See Using the Move action on page 697.
Scroll	See Using the Scroll action on page 698.

Secure Recording

When secure recording mode is enabled, bots do not capture object images or values. This ensures that sensitive data is not stored in the bots.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#) on page 1131.

Using the Click action

Use the Click action to enable a bot to simulate mouse clicks. This action enables to capture the UI element such as the screen or window, and to specify the click event and click button.

Ensure that the screen scale and resolution of the Bot Creator device is the same as the Bot Runner device. If the screen scale and resolution are different, the bot might fail when deployed to the Bot Runner device.

Follow these steps to add a Click action:

1. In the Actions palette, double-click or drag the Click action from the Mouse package.
2. Specify the window in which to capture the mouse click:

Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows.
 Note: You can use the Screen option to capture coordinates on the device screen, however we recommend specifying a window because screen sizes can change, which distorts the captured coordinates.	
Browser	Select from a list of Google Chrome tabs.

Option	Description
Variable	Select an existing window variable to specify the title of the application window title.
	 Note: This option deactivates the Capture button. Use this option only after you are done with the capture step.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad)` for all the window title names starting with `((\w*) -Notepad)`, or use Pattern such as `((\w*)\s)*document-Notepad` for only those window titles that match this pattern.

- Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

- Click Capture coordinate.
The selected window appears.
- Drag the mouse to select the click spot and left-click to capture it.
The captured spot appears in the Preview section with the coordinates underneath.
- In the Button option, specify the button to click.
Choose from Left Button, Right Button, or Middle Button.
- In the Event option, specify the event.
Choose from Click, Double click, Button up, or Button down.
- Click Save.

Using the Move action

Use the Move action to simulate moving the mouse pointer from one location to another.

Follow these steps to add a Move action:

- In the Actions palette, double-click or drag the Move action from the Mouse package.
- In the Mouse from and Mouse to fields, specify the X and Y coordinates.
- Click Capture coordinate to capture the starting point location.
- Click Capture coordinate to capture the end point location.
- Optional: In the Delay in milliseconds field, specify the total duration of the movement in milliseconds.
- Click Save.

Using the Scroll action

Use the Scroll action to simulate scrolling the mouse wheel up or down.

Follow these steps to add a Scroll action:

1. In the Actions palette, double-click or drag the Scroll action from the Mouse package.
2. In the Select scroll option, select the Up or Down option.
3. In the Number of iterations field, specify the number of times to scroll.
4. Optional: In the Delay in milliseconds field, specify the total duration of the scrolling in milliseconds.
5. Click Save.

Number package

The Number package contains actions that enable you to perform various operations on a number variable. A number variable holds numeric values, including integers and decimals. It holds values from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807, and up to 15 decimal digits.

Actions in the Number package

The actions in the Number package accept a variable as an input and assign the output to a variable. These actions enable you to assign a value to a Number variable, decrement or increment a number, or convert a Number variable to a String variable.

The Number package includes the following actions:

Action	Description
Assign	Assigns a specified number or result of an expression to a user-defined Number variable. You can use expressions built using the +, -, *, and / operators and use parentheses to group expressions. For example, (3*4)+5 or (\$Variable2*\$Variable3)/\$Variable1. • Enter a number or select a predefined Number variable. • Select a predefined number variable or create a new one to hold the output.
Decrement	Decrements (decreases by set intervals) a number by a user-specified value. • Enter a number or select a predefined Number variable. • Enter the decrement value or select a predefined Number variable. • Select a predefined number variable or create a new one to hold the output.

Action	Description
Increment	Increments (increases by set intervals) a number by a user-specified value. - Enter a number or select a predefined Number variable. - Enter the increment value, the value must be greater than zero or select a predefined Number variable. - Select a predefined number variable or create a new one to hold the output.
Random	Generates a random integer from a user-specified range and assigns it to a number variable. - In the Beginning of range field, enter a number or select a predefined number variable.  Note: This field accepts values in the range of -9,223,372,036,854,775,808 through 9,223,372,036,854,775,807, and up to 15 decimal digits. - In the End of range field, enter a number or select a predefined number variable that is greater than the value in the Beginning of range field.  Note: This field accepts values in the range of -9,223,372,036,854,775,808 through 9,223,372,036,854,775,807, and up to 15 decimal digits. - Select a predefined number variable or create a new one to hold the output.
To string	Converts a user-specified number to a string. - Enter a number or select a predefined Number variable. - Enter the amount of digits after the decimal. To remove all the digits after the decimal, leave the default value of 0. - Assign the output to a String variable. You can use prompt-assignment during building and testing of the bot.  Important: Ensure that you reassign the values from prompt-assignment to a user-created variable before deploying the bot into production.

OCR package

The OCR package contains actions that enable you to extract text from images or applications.

The OCR package enables you to:

- Extract text from a window or a specific area of an application.
- Extract text from images or files stored on a local machine, a website, or the Enterprise Control Room folder.
- Filter extracted text and store it as a variable.



Note: You can extract text from images in .jpeg, .jpg, .bmp, .gif, and .png formats.

ABBYY FineReader 12 is installed along with A2019 and does not require any additional setup.

Actions in the OCR package

The OCR package includes the following actions:

Action	Description
Capture image by path	See Using Capture image by path action on page 700.
Capture image by url	See Using Capture image by URL action on page 701.
Capture window	See Using Capture window action on page 701.
Capture area	See Using Capture area action on page 703.

Secure Recording

When secure recording mode is enabled, bots do not capture object images or values. This ensures that sensitive data is not stored in the bots.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#) on page 1131.

Using Capture image by path action

Use the Capture image by path action to extract text from an image on a device or a folder in the Enterprise Control Room. The extracted text can assigned as a variable.

Follow these steps to use the Capture image by path action:

1. In the Actions palette, double-click or drag the Capture image by path action from the OCR package.
2. In the Image path field, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room.
 - Desktop file: Uses a file that is available on a device.
 - Variable: Uses a file variable to specify the file location.
3. Select the Filter the captured text check box to filter the captured text.

Specify the text to filter out in the Before and After fields. For example, if the extracted text is `Name : ABC Inc. Location :`, to retrieve `ABC Inc.`, you must specify `Location :` in the Before field and `Name :` in the After field.

4. Select the Trim the captured text check box to trim the extra spaces.
5. Select the Load Profile check box and select an option to load the locale based on the ABBYY profile:
 - Control Room file: Uses a file that is available on the Enterprise Control Room.
 - Desktop file: Uses a file that is available on a device.
 - Variable: Uses a file variable to specify the file location.
6. In the Select locale list, select the language of the device.



Note: Currently, only English and Japanese locales are supported. If you have selected an option from the Select locale list and the Load Profile option, the system considers the locale based on the Load Profile selection.

7. In the Assign value to variable list, select a string variable.
8. Click Save.

Using Capture image by URL action

Use the Capture image by url action to extract text from an online image. You can filter the extracted text and assign it to a string variable.

Follow these steps to use the Capture image by url action:

1. In the Actions palette, double-click or drag the Capture image by url action from the OCR package.
2. In the Image url field, specify the URL.



Note: A URL of an image on a shared drive or an FTP server is not supported.

3. Select the Filter the captured text check box to filter the captured text.
Specify the text to filter out in the Before and After fields. For example, if the extracted text is `Name : ABC Inc. Location :`, to retrieve `ABC Inc.`, you must specify `Location :` in the Before field and `Name :` in the After field.
4. Select the Trim the captured text check box to trim the extra spaces.
5. Select the Load Profile check box and select an option to load the locale based on the ABBYY profile:
 - Control Room file: Uses a file that is available on the Enterprise Control Room.
 - Desktop file: Uses a file that is available on a device.
 - Variable: Uses a file variable to specify the file location.
6. In the Select locale list, select the language of the device.



Note: Currently, only English and Japanese locales are supported. If you have selected an option from the Select locale list and the Load Profile option, the system considers the locale based on the Load Profile selection.

7. In the Assign value to variable list, select a string variable.
8. Click Save.

Using Capture window action

Use the Capture window action to extract text from an application window. You can filter the extracted text and assign it to a string variable.

Follow these steps to use the Capture window action:

1. In the Actions palette, double-click or drag the Capture window action from the OCR package.

2. In the Window title field, select an option:
 - Window: Captures a window on a desktop. In the Window title field, specify the application title.
 - Variable: Inserts an existing window variable. Click Variable tab to create a new string variable.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad` for all the window title names starting with `((\w*) -Notepad`, or use Pattern such as `((\w*) \s) *document-Notepad` for only those window titles that match this pattern.

3. Optional: Select the Resize window option to specify the window dimensions.
This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.
 - If the window is maximized when you record the task, this option is unselected.
 - If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

4. In the Wait before capturing the image (ms) field, specify the delay time.



Recommendation: If you are capturing in a window that is accessed using Remote Desktop Protocol (RDP), set a minimum delay time of 1000 milliseconds to give the window time to load.

5. Select the Filter the captured text check box to filter the captured text.
Specify the text to filter out in the Before and After fields. For example, if the extracted text is `Name : ABC Inc. Location :`, to retrieve `ABC Inc.`, you must specify `Location :` in the Before field and `Name :` in the After field.
6. Select the Trim the captured text check box to trim the extra spaces.
7. Select the Load Profile check box and select an option to load the locale based on the ABBYY profile:
 - Control Room file: Uses a file that is available on the Enterprise Control Room.
 - Desktop file: Uses a file that is available on a device.
 - Variable: Uses a file variable to specify the file location.

8. In the Select locale list, select the language of the device.



Note: Currently, only English and Japanese locales are supported. If you have selected an option from the Select locale list and the Load Profile option, the system considers the locale based on the Load Profile selection.

9. In the Assign value to variable list, select a string variable.
10. Click Save.

Using Capture area action

Use the Capture area action to extract text from a specific area in an application window. You can filter the extracted text and assign it as a variable.

Follow these steps to use the Capture area action:

1. In the Actions palette, double-click or drag the Capture area action from the OCR package.
2. In the Window title field, select an option:
 - Window: Captures a window on a desktop. In the Window title field, specify the application title.
 - Variable: Inserts an existing window variable.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad)` for all the window title names starting with `((\w*) -Notepad)`, or use Pattern such as `((\w*)\s)*document-Notepad` for only those window titles that match this pattern.

3. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

4. Specify the X, Y, Width, and Height coordinates.
5. Click Capture region.

The bot captures text from the visible area of the screen even if the target area is below the visible screen.

6. In the Wait before capturing the image (ms) field, specify the delay time.



Recommendation: If you are capturing in a window that is accessed using Remote Desktop Protocol (RDP), set a minimum delay time of 1000 milliseconds to give the window time to load.

7. Select the Filter the captured text check box to filter the captured text.
Specify the text to filter out in the Before and After fields. For example, if the extracted text is `Name : ABC Inc. Location :` to retrieve `ABC Inc.`, you must specify `Location :` in the Before field and `Name :` in the After field.
8. Select the Trim the captured text check box to trim the extra spaces.
9. Select the Load Profile check box and select an option to load the locale based on the ABBYY profile:
 - Control Room file: Uses a file that is available on the Enterprise Control Room.
 - Desktop file: Uses a file that is available on a device.
 - Variable: Uses a file variable to specify the file location.
10. In the Select locale list, select the language of the device.



Note: Currently, only English and Japanese locales are supported. If you have selected an option from the Select locale list and the Load Profile option, the system considers the locale based on the Load Profile selection.

11. In the Assign value to variable list, select a string variable.
12. Click Save.

Office 365 Calendar package

The Office 365 Calendar package contains actions that enable you to automate meeting-related tasks in Office 365 Calendar.

Before you start

Perform the following actions within the Office 365 Calendar package as part of using the set of available actions:

1. Use the Connect action to establish a connection to the Office 365 server.

See [Using the Connect action](#) on page 709.



Note: Office 365 packages do not currently support Multi-Factor Authentication or Single Sign-on.

2. Use a combination of actions available in this package to automate tasks.



Note: To use actions from other Office 365 packages, establish a connection using the Connect action from that package.

3. Use the Disconnect action to terminate the connection.

Actions in the Office 365 Calendar package

The Office 365 Calendar package includes the following actions:



Note: Some of the actions must be used within a Loop action to apply the action to each meeting in the calendar. See [Using Office 365 Calendar actions in a loop](#) on page 708.

Action	Description
Add attachment	Adds one or more attachments to a meeting. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687. • Provide the session name that you used in the Connect action. • Select the files to attach from the Enterprise Control Room or your desktop, or insert a file variable. Separate each file path with a comma.

Action	Description
Add attendees	Adds one or more attendees to a meeting and specifies whether attendance is optional or required. During run time, this action triggers an email notification to meeting attendees. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687. • Provide the session name that you used in the Connect action. • Enter the attendee emails into the Required or Optional fields. Separate each email with a comma.
Cancel meeting	Cancels the meeting. During run time, this action triggers an email notification to meeting attendees. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687.
Connect	Establishes a connection with the Office 365 server using your organization's client ID and tenant ID, and user credentials. See Using the Connect action on page 709.
Create meeting	See Using the Create Meeting action on page 707.
Delete attendees	Deletes attendees from a meeting. During run time, this action triggers an email notification to meeting attendees. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687. • Provide the session name that you used in the Connect action. • Select an option to delete: meeting or attendees. To delete attendees, provide the email addresses of the attendees, separated by commas.

Action	Description
Delete meeting information	Deletes information related to a meeting such as the title or location. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687. • Provide the session name that you used in the Connect action. • Select the meeting information to delete. The options are: • Title • Location • Agenda • Reminder • Recurrence • Is all day
Disconnect	Terminates the connection with the Office 365 server. Enter the session name that you used in the Connect action. Insert this action at the end of automation sequences that use actions from this Office 365 package.
Get available meeting slot(s)	See Using the Get available meeting slots action on page 708.
Modify meeting	Modifies information for a meeting. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687. • Provide the session name that you used in the Connect action. • Modify any of the following: • Meeting start or end date. • Convert the meeting to all day. • Revise the meeting title. • Revise the agenda. • Update the location. • Update the reminder. • Update the recurrence, frequency, start date, and end date.
Respond to meeting	Responds to a meeting as accepted, rejected, or tentative. You can also add a message to the response. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See Loop package on page 687.

Using the Create Meeting action

Use the Create Meeting action to specify a meeting agenda, attachments, attendees, duration, location, recurrence, and title. During run time, this action sends an invitation email to meeting attendees.

This action uses two Datetime variables to set the meeting start and end. Define the values before you start. The recurrence option also uses two Datetime variables to set the start and end. For more information, see [User-defined variables](#) on page 869.

To create a meeting, do the following:

1. Enter the session name that you used in the Connect action.
2. Enter the calendar name.
This field is case-sensitive.
The prepopulated value is Calendar; this is the default Office 365 setting.
3. Specify the meeting start date and time.
Select a DateTime variable from the drop-down list.
4. Specify the meeting end date and time.
Select a DateTime variable with a value that is the same or after the start time.
5. Optional: Mark the All day meeting option.
For an all day meeting, ensure that there is a one-day difference between the start and end dates.
6. Enter attendee email addresses, separated by commas.
7. Optional: Enter the following details:

- Attach a file from the Enterprise Control Room, Desktop, or insert a File variable.
- Enter a meeting title.
- Enter a meeting location.
- Enter an agenda.
- Set a reminder.
- Set a recurrence with the following options:
 - Select the recurrence type: Daily, Weekly, Monthly, or Yearly.
 - For Weekly recurrence, mark the days of the week on which the meeting takes place.
 - For Monthly recurrence, either enter the numerical date or select a day.

For example, to schedule a meeting that takes place on the twenty-fifth day of the month enter 25 in the Specific date field.



Note: If you enter 31 in the Specific date field, for the months with less than 31 days, the meeting will schedule for the last day of the month.

To schedule it for the last Monday of the month, select Last from the Occurrence drop-down list and Monday from the Weekday drop-down list.

- For Yearly recurrence, either enter the numerical date and month or select a day and month.

For example, to schedule a meeting that takes place on March 15, enter 15 in the Specific Date field and March in the Month field. To schedule it for the second Friday in March, select Second from the Occurrence drop-down list, select Friday from the Weekday drop-down list, and March from the Month drop-down list.

- Enter the recurrence frequency.
- Specify the recurrence start by selecting a DateTime variable from the drop-down list.

- If the recurrence has an end date, select a DateTime variable from the drop-down list.

Using the Get available meeting slots action

Use the Get available meeting slots action to retrieve available time slots for attendees in a specified date and time range. This action supports scheduling across time zones.

This action considers a time slot as available if it is within an attendee's working hours and if the attendee has not already accepted a meeting for that time. If an attendee tentatively responds or does not respond to an invitation, this action considers them available.

To retrieve available time slots, perform the following steps:

1. Enter the session name that you used in the Connect action.
2. Enter the email addresses of the attendees, separated by commas.
3. Enter the duration of the meeting in minutes.
4. Specify the range start date and time by selecting a DateTime variable from the drop-down list.
5. Specify the range end date and time by select a DateTime variable with a value that is the same or after the start time.
6. Optional: Select the Check for timeslots outside working hours option.
7. Select a Table variable from the drop-down list.
8. Click Save.

Using Office 365 Calendar actions in a loop

You must use certain Office 365 Calendar actions within a Loop action.

This action uses two Datetime variables to set the meeting start and end. Define the values before you start. For more information, see [User-defined variables](#) on page 869.

To use an Office 365 Calendar action within a loop, follow these steps:

1. Double-click or drag the Loop action from the Loop package in the Actions palette.
2. Select the For each meeting in calendar iterator.
3. Enter the session name that you used in the Connect action.
4. Enter the calendar name.
This field is case-sensitive.
The prepopulated value is Calendar; this is the default Office 365 setting.
5. Select whether to loop through All meetings in the calendar or only meetings with the specific title.
6. Specify the meeting start date and time.
Select a DateTime variable from the drop-down list.
7. Specify the meeting end date and time.
Select a DateTime variable with a value that is the same or after the start time.
8. Optional: Enter the location.
9. Optional: Enter the duration in minutes.
10. Optional: Mark the All day meeting option.
For an all day meeting, ensure that there is a one-day difference between the start and end dates.
11. Optional: Enter the meeting owner's email address.
12. Select or create a record variable to hold the output.

Using the Connect action

Use the Connect action to establish a connection with the Office 365 server using your organization's (client ID and tenant ID) and user credentials. All of the fields in this action accept a credential from the Credential Vault or a user-input value.



Note:

- The Connect action does not currently support Multi-Factor Authentication or Single Sign-on.
- The best practice is for a system administrator to perform the following steps.

1. Log in to the [Azure portal](#) using your Office 365 credentials.
2. Register your application with the Microsoft identity platform to obtain the client ID and tenant ID. See [Register your app](#).
3. Grant the required permissions for Microsoft Graph to the application. See [Permissions for application](#) on page 709.
4. To add a client secret, you must first subscribe to Azure. See [Subscribe to Azure](#).
5. Add a client secret. See [Add a client secret](#).

To establish a connection to the Office 365 server, follow these steps:

1. In the Actions palette, double-click or drag the Connect action from the package you want to use.
2. In the User session field, enter a name for this session.
Provide this session name in subsequent actions from this package.
3. In the Username and Password fields, enter your user credentials or insert them from the Credential Vault.
4. In the Tenant ID field, enter the unique ID for your Office 365 subscription or insert it from the Credential Vault.
5. In the Client ID field, enter the Office 365 client or insert it from the Credential Vault.
6. In the Client Secret Key field enter your access token or insert it from the Credential Vault.
7. Click Save.

Permissions for application

After registering the Office 365, you must grant certain permissions to the application. These permissions are required to enable Office 365 packages to perform various operations.

To grant permissions to an application, see [Add permissions](#).

The following [Delegated permissions](#) for Microsoft Graph are required for Office 365 packages:

Common permissions	
	openid
	offline_access
	User.ReadWrite.All
	Group.Read.All
	Group.ReadWrite.All
Excel	

	Files.ReadWrite.All
	Sites.ReadWrite.All
One Drive	
	Files.ReadWrite.All
	Sites.ReadWrite.All
Calendar	
	Calendars.Read
	Calendars.Read.Shared
	Calendars.ReadWrite
	Calendars.ReadWrite.Shared

Apart from the above permissions, you can grant additional permissions based on your requirements. See, [Microsoft Graph permission reference](#).

Office 365 Excel package

The Office 365 Excel package contains actions that enable you to automate tasks in the online version of Microsoft Excel.

Choosing the Excel package in Enterprise A2019

Enterprise A2019 includes packages to support three types of Microsoft Excel usage. For optimal results, use the package that corresponds to the type of Excel that is available on the device you are running bots on.

- No Excel installed: If you do not have Microsoft Excel installed on the device on which you are running bots to automate Excel-related processes, use the Excel basic package.
- Desktop Excel installed: If you have a desktop version of Microsoft Excel installed on your computer, use the Excel advanced package in your bots.
- Online Office 365 Excel only: If you are using Microsoft Excel 365 on a web browser, use the Office 365 Excel package for automating tasks related to Excel.

Before you start

1. Use the Connect action to establish a connection to the Office 365 server.

See [Using the Connect action](#) on page 709.



Note: Office 365 packages do not currently support Multi-Factor Authentication or Single Sign-on.

2. Use the Open action to select a workbook, or the Create action to create a new workbook. See [Workbook operations](#) on page 721.
3. Optional: If the workbook contains more than one worksheet, use the Activate sheet action to specify which worksheet to use.
4. Use a combination of actions available in this package to automate tasks.



Note: To use actions from other Office 365 packages, establish a connection using the Connect action from that package.

5. Use the Close action to exit from the workbook.
6. Use the Disconnect action to terminate the connection.

Actions in the Office 365 Excel package

The actions in the Office 365 Excel package enable you to perform the following operations:

Operations	Description
Cell	Perform operations related to cell and range operations, such as append, delete, format, get properties, and insert. See Cell operations on page 711
Row and column	Perform operations related to column and row operations such as autofit, delete, and read. See Column/Row operations on page 717.
Table	Perform operations related to the table operations such as create, delete, filter, get properties, rename, and sort. See Table operations on page 719.
Workbook	Automate opening, closing, and creating a workbook. See Workbook operations on page 721.
Worksheet	Perform operations related to worksheet operations, such as activate, delete, find, get worksheet names, hide, retrieve worksheet count, and show. See Worksheet operations on page 722.

Cell operations

The Office 365 Excel package contains actions that you can use to automate tasks related to cell and range operations, such as append, delete, format, get properties, and insert.

The Office 365 Excel package includes the following actions:

Action	Description
Delete cell	Deletes the Active cell or a Specific cell from the current worksheet. • Enter the name of the session used to open the workbook with the Open action. • If you select Specific cell, enter the cell location. For example A1. • Select one of the following options: • Shift cells left: Deletes the specified cell and shifts the cell one position to left. • Shift cells up: Deletes the specified cell and shifts the cell one position up. • Entire row: Deletes the entire row that contains the cell that you have specified to delete. • Entire column: Deletes the entire column that contains the cell that you have specified to delete.
Delete range	Deletes a specific range of cells. • Enter the name of the session used to open the workbook with the Open action. • Enter the cell range. For example A1 : B4. This deletes an area consisting of the first four rows by the first two columns. • Use the radio buttons to specify whether to shift the cells up or left. • Shift cells up: Deletes the specified cells and shifts the cells up by the number of rows deleted. • Shift cells left: Deletes the specified cells and shifts the cells left by the number of columns deleted.
Format cell	See Using the Format cell action on page 715.
Get cell	Retrieves the value of a cell. • Enter the name of the session used to open the workbook with the Open action. • Select the Active cell or Specific cell option and enter the cell location. • Assign the output to a String variable. To perform mathematical operations, convert the string to a number. See the String > Convert action.
Get cell/text color	See Using the Get cell/text color action on page 717.

Action	Description
Get multiple cells	Retrieves the value(s) of multiple cells within a worksheet and assigns the output to a variable. - Enter the name of the session used to open the workbook with the Open action. - Select the Multiple cells or All cells option. If you select Multiple cells, enter the cell range, such as A1:D1. This retrieves the values of the first four cells in the top row. - Assign the output to a String variable. To convert the string to a number, see the String > Convert action.
Go to cell	Moves the cursor to a specific cell in the worksheet. - Enter the name of the session used to open the workbook with the Open action. - Select from the following options: - Specific cell: Moves to the specified cell address. - One cell to the left: Moves one cell left. - One cell to the right: Moves one cell right. - One cell above: Moves one cell up. - One cell below: Moves one cell down. - Beginning of row: Moves to the first cell in the same row. - End of row: Moves to the last cell that contains data in the same row. - Beginning of column: Moves to the first cell in the same column. - End of column: Moves to the last cell that contains data in the same column.
Insert cell	Inserts a value to the Active cell or a Specific cell in the current worksheet without overwriting the existing value. - Enter the name of the session used to open the workbook with the Open action. - If you select Specific cell, enter the cell location. For example A1. - After inserting the cell, you can: - Shift cells down: Shifts the existing values down by the specified number of rows. - Shift cells right: Shifts the existing values right by the specified number of columns.

Action	Description
Insert range	Inserts the range into the current worksheet without overwriting the existing value. • Enter the name of the session used to open the workbook with the Open action. • Enter the cell range. For example A1:B4. This inserts a range of cells consisting of the first four rows by the first two columns. • After inserting the cell, you can: • Shift cells down: Shifts the existing values down by the specified number of rows. • Shift cells right: Shifts the existing values right by the specified number of columns.
Paste cell	Copies a value from a cell and pastes to a specified cell. If there is a value in the destination cell, this action will overwrite the value. • Enter the name of the session used to open the workbook with the Open action. • Select the Active cell or Specified cell option to specify the cell from which to copy the value. If you have selected the Specified cell option, specify the address of the cell in the field. • Enter the destination cell address to paste the value. For example, B3.
Read cell format	Gets the format of the Active cell or Specified cell and assigns the output to a string variable. This action returns a blank value if the specified cell does not contain a formula. • Enter the name of the session used to open the workbook with the Open action. • Select the Active cell or Specified cell option to specify the cell from which to read the format. If you have selected the Specified cell option, specify the address of the cell in the field. • Select a String variable to store the cell format from the Assign the output to variable list.
Read cell formula	Gets the formula available in the Active cell or Specified cell and assigns the output to a string variable. This action returns a blank value if the specified cell does not contain a formula. • Enter the name of the session used to open the workbook with the Open action. • Select the Active cell or Specified cell option to specify the cell from which to read the formula. If you have selected the Specified cell option, specify the address of the cell in the field. • Select a string variable to store the name of the formula from the Assign the output to variable list.

Action	Description
Set cell	Sets a value in the Active cell or Specific cell in a Microsoft Excel spreadsheet or a CSV file. You can also use this action to set a formula. - Select the Active cell or Specified cell option to specify the cell in which to set the value. If you have selected the Specified cell option, specify the address of the cell in the field.  Note: You can enter a cell range in the Specific cell field to set a particular value in all the cells of the range. For example, to set a value of 5 on all cells in the second row and from the first through third column, enter A2 : C2. - Enter the value to set in the Cell value field. - Enter the name of the session used to open the workbook with the Open action.
Set cell color	Sets a color to the background or text of the Active cell or Specific cell. - Enter the name of the session used to open the workbook with the Open action. - Select the Active cell, Specified cell, or Cell range option to specify the cell in which to set the color. If you have selected the Specified cell option, specify the address of the cell in the field. - Select which to apply the color to: the Cell or Text within cell. - Enter the value to set in the Cell value field. Use either the color name or the hex value. For a list of color names and corresponding hex values, see Frequently used cell colors on page 716.
Set cell formula	Sets the formula of the specified cell. - Enter the name of the session used to open the workbook with the Open action. - Select the Active cell, Specified cell, or Cell range option to specify the cell in which to set the color. If you have selected the Specified cell option, specify the address of the cell in the field. - Enter the value to set in the Cell formula field without an "=".

Using the Format cell action

Use the Format cell action to set the format of a cell or group of cells.

To format a cell or group of cells, do the following:

1. Double-click or drag the Format cell action.
2. Enter the name of the session used to open the workbook with the Open action.
3. Select the Active cell, Specific cell, or Multiple cells option and provide cell location or cell range, as necessary.
4. Mark the Font option to modify any of the following:

- Font name
 - Font size (between 8 and 72)
 - Bold or italicize
 - Underline
 - Font color (accepts color name or hex value). For a list of color names and corresponding hex values, see [Frequently used cell colors](#) on page 716.
5. Mark the Alignment option, then use the drop-down lists to modify the vertical or horizontal alignment.
 6. Mark the wrap text option to expand the cell(s) vertically to show long strings of text.
 7. Mark the Merge Type option to select the any of the following operations:
 - Merge and center
 - Merge across
 - Merge cells
 - Unmerge
 8. Click Save.

Frequently used cell colors

The table below contains color names and their corresponding hex values. These are the most frequently used options for formatting worksheets.

Name	Hex
Aqua	#00FFFF
Black	#000000
Blue	#0000FF
Gray	#808080
Green	#008000
Fuchsia	#FF00FF
Lime	#00FF00
Maroon	#800000
Navy	#000080
Olive	#808000
Purple	#800080
Red	#FF0000
Silver	#C0C0C0
Teal	#008080
White	#FFFFFF
Yellow	#FFFF00

Using the Get cell/text color action

Use the Get cell/text color action to get the color of the background or text in a cell. This action retrieves the color of a cell as RGB values. For example, if the background or text in a cell is of red color, the value retrieved is 255,0,0.

To get the color of the background or text in a cell, do the following:

1. Double-click or drag the Get cell/text color action.
2. Enter the name of the session used to open the workbook with the Open action.
3. Select the Active cell option to get the color from the current active cell or the Specific cell option to get the color from the address of the cell you have specified.
4. Select the Cell color option to get the background color of the cell, the Text color option to get the color of the text, or both.
5. Specify whether to retrieve the cell color by name or as an RGB value.
6. Select a variable from the Assign the output to variable list to assign the cell/text color to a List variable.
7. Click Save.

If both cell and text colors are retrieved, the List variable contains the cell color at index 0 and text color at index 1.

Column/Row operations

The Office 365 Excel package contains actions that you can use to automate tasks related to column and row operations such as autofit, delete, insert, and read.

The Office 365 Excel package includes the following actions:

Actions	Description
Autofit columns	Adjusts the width of the columns in the worksheet in the specified session. Use Enter the name of the session used to open the workbook with the Open action.
Autofit rows	Adjusts the height of the rows in the worksheet in the specified session. Use Enter the name of the session used to open the workbook with the Open action.
Delete row/column	See Using Delete action for rows or columns on page 718.
Get row count	Retrieves the number of rows that contain data in the worksheet. • Enter the name of the session used to open the workbook with the Open action. • Assign the output value to a Number variable. To convert the variable to a String variable, see the Number > Convert action.
Insert row/column	See Using Insert action for rows or columns on page 719.

Actions	Description
Read column	Extracts data from a column and stores it in a List variable. • Enter the name of the session used to open the workbook with the Open action. • Select the From active cell or From specific cell option to specify the starting point. • You can also select the Read full column option to extract data for the entire column. • Assign the output value to a List variable.
Read row	Extracts data from a row and stores it in a Record variable. • Enter the name of the session used to open the workbook with the Open action. • Select the From active cell or From specific cell option to specify the starting point. • You can also select the Read full row option to extract data for the entire row. • Assign the output value to a Record variable.

Using Delete action for rows or columns

Use the Delete action to remove rows or columns from the current worksheet.

To delete rows or columns in a worksheet, do the following:

1. Double-click or drag Office 365 Excel > Delete.
2. Enter the name of the session used to open the workbook with the Open action.
3. Select one of the following:
 - Row operations
 - a. Select the Delete Row(s) at option to delete all of the cells in a specific row. Specify the row number to delete in the field. For example, to delete the tenth row in the worksheet, enter 10 in the field.
 - b. Select the Delete Row(s) by option to delete all of the cells in either:
 - the row of the active cell.
 - a specific range of cells. Specify the range to delete. For example, to delete the first five rows, enter 1 : 5 in the field.
 - Column operations
 - a. Select the Delete Column(s) at option to delete all of the cells in a specific column. Specify the address of the column to delete in the field. For example, to delete column 'D' in the worksheet, enter D in the field.
 - b. Select the Delete Columns(s) by option to delete all of the cells in either:
 - the column of the active cell.

- a specific range of cells. Specify the range to delete. For example, to delete the first five columns, enter **A:E** in the field.

4. Click Save.

Using Insert action for rows or columns

Use the Insert action to create rows or columns in the current worksheet.

To insert or delete rows or columns in a worksheet, do the following:

1. Double-click or drag Office 365 Excel > Insert.
2. Enter the name of the session used to open the workbook with the Open action.
3. Select one of the following:
 - Row operations
 - a. Select the Insert Row(s) at option to insert a row and specify the location where to insert the row in the field. For example, to insert a row of cells in the tenth row in the worksheet, enter 10 in the field.
 - b. Select the Insert Row(s) by option to insert all of the cells in either:
 - the row of the active cell.
 - a specific range of cells. Specify the range where to insert the row. For example, to insert a row of cells in the first five rows in the worksheet, enter **1:5** in the field.
 - Column operations
 - a. Select the Insert Column(s) at option to insert a column and specify the location where to insert the row in the field. For example, to insert a column of cells in column 'D' in the worksheet, enter D in the field.
 - b. Select the Insert Columns(s) by option to insert all of the cells in either:
 - the column of the active cell.
 - a specific range of cells. Specify the range to insert the column. For example, to insert a row of cells in the first five columns, enter **A:E** in the field.

4. Click Save.

Table operations

The Office 365 Excel package contains various actions that you can use to automate tasks related to the table operations such as create, delete, filter, get properties, rename, and sort.

The Office 365 Excel package includes the following actions:

Actions	Description
Create table	Creates a new table in the specified table range. • Enter the name of the session used to open the workbook with the Open action. • Enter the table name. • Enter the cell range in which to create the table. For example, A1:D4. • Optional: Select the Table has headers option to establish the first row as the header row.
Delete table	Deletes the table in the active worksheet. • Enter the name of the session used to open the workbook with the Open action. • Enter the table name.
Get table column	Retrieves the column values of a specified table and column index, and assigns the values to a List variable. • Enter the name of the session used to open the workbook with the Open action. • Enter the table name. • Enter the column index. For example, enter 5 to indicate the fifth column from the left. • Select a List variable to store the values.
Get table names	Retrieves the names of all the tables in a workbook and assigns them to a List variable. • Enter the name of the session used to open the workbook with the Open action. • Optional: Select whether to specify a sheet either by index or name. • Select a List variable to store the values.
Get table row	Retrieves the row values of a specified table and row index, and assigns the values to a Record variable. • Enter the name of the session used to open the workbook with the Open action. • Enter the table name. • Enter the row index. For example, enter 5 to indicate the fifth row from the top. • Select a Record variable to store the values.

Actions	Description
Get table row count	Retrieves the row count of a specified table and assigns the values to a number variable. - Enter the name of the session used to open the workbook with the Open action. - Enter the table name. - Select a Number type variable to store the values. To convert the variable to a String type variable, see the Number > Convert action.
Rename table	Renames a table. - Enter the name of the session used to open the workbook with the Open action. - Enter the current table name. - Enter a new table name.

Workbook operations

The Office 365 Excel package contains actions that you can use to automate opening, closing, or creating a new workbook.

The Office 365 Excel package includes the following actions:

Actions	Description
Close	Closes the workbook. Use Enter the name of the session used to open the workbook with the Open action.
Create workbook	Creates a new workbook. - Enter Enter the name of the session used to open the workbook with the Open action. - Provide a File Path containing the new workbook name with one of the following extensions: .xls, .xlsm, .xlsx. Either enter the file path or select a String variable. For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter <code>Accounts/SalesReport.xlsx</code>.
Open	See Using the Open action on page 721.

Using the Open action

Use this action to open a workbook. Insert this action at the start of your automation sequences.

To open a workbook, do the following:

1. Double-click or drag the Open action.
2. Provide the username either by selecting a Credential variable or entering an unencrypted value.
3. Enter a Session name.
Use this same session name in subsequent actions to associate them with this workbook.
4. Enter the File Path or insert a file variable.

For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter `Accounts/SalesReport.xlsx`.

5. If the sheet contains a header row, mark the Sheet contains header option.
6. Click Save.

Worksheet operations

The Office 365 Excel package contains actions that you can use to automate tasks related to worksheet operations, such as delete, find, get worksheet names, hide, retrieve worksheet count, and show.

The Office 365 Excel package includes the following actions:

Actions	Description
Copy worksheet	See Using the Copy worksheet action on page 724.
Create worksheet	Adds an empty sheet in the current workbook. - Enter the name of the session used to open the workbook with the Open action. - Enter a Worksheet name of up to 31 characters. The name cannot contain the following characters: \ / ? * []
Delete worksheet	Deletes a spreadsheet from the current workbook. - Enter the name of the session used to open the workbook with the Open action. - Specify either an index number in the Sheet by Index field or a name in the Sheet by Name field for the worksheet. The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.  Note: You can delete a worksheet only if the workbook contains more than one worksheet.
Get current worksheet name	Retrieves the name of the currently active worksheet. - Enter the name of the session used to open the workbook with the Open action. - Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.

Actions	Description
Get worksheet names	Retrieves the names of all the worksheets in the workbook. • Enter the name of the session used to open the workbook with the Open action. • Select a list variable to store the worksheet names from the Assign the output to variable list.
Hide worksheet	<p>Hides a worksheet from the current workbook.</p> • Specify the name of the worksheet to hide in the Enter worksheet name to hide field. <div data-kind="parent" data-rs="2"></div> <div data-kind="parent" data-rs="2"> <p>Note: You can hide a worksheet only if the workbook contains more than one worksheet.</p> </div> • Enter the name of the session used to open the workbook with the Open action.
Rename worksheet	<p>Renames a worksheet in the current workbook.</p> • Specify the index number or name of the worksheet to rename in the Sheet by Index or Sheet by Name field. <p>The index number is the number assigned to a worksheet. For example, if you want to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.</p> <div data-kind="parent" data-rs="2"></div> <div data-kind="parent" data-rs="2"> <p>Note: You cannot rename the worksheet if a worksheet with the same name already exists in the workbook.</p> </div> • Enter the new worksheet name that is under 31 characters. • Enter the name of the session used to open the workbook with the Open action.

Actions	Description
Retrieve sheet count	Gets the number of sheets available in the current workbook and stores it in a number variable. • Select the appropriate option to specify whether to include the hidden worksheet or not and assign the count to a variable. • Enter the name of the session used to open the workbook with the Open action. • Select a number variable that you want to use to store the name of the worksheet from the Select the variable to assign to list.
Show worksheet	Shows the hidden worksheet. • Enter the name of the session used to open the workbook with the Open action. • Enter the Worksheet name.
Switch to sheet	Activates a particular sheet in a Microsoft Excel file. • Enter the name of the session used to open the workbook with the Open action. • Specify whether to activate the Sheet by Index (numerical value) or Sheet by Name.

Using the Copy worksheet action

Use the Copy worksheet action to copy values of a worksheet from one worksheet to another. This action overwrites any existing values. To move values from one worksheet to another without overwriting existing values, use the Append worksheet action.

Open the workbook(s) containing the source and target worksheets. See [Using the Open action](#) on page 721.



Note: This action identifies the destination and source workbooks by the session names used to open them. If opening two workbooks, enter a session name for the source workbook that is different than the one used to open the destination workbook.

To copy the values of a worksheet into another, do the following:

1. Double-click or drag the Copy worksheet action.
2. Enter the name of the session that you used to open the destination workbook in the Open action.
3. If the workbook contains more than one worksheet, mark the Specific Sheet option, then enter the index number or name of the source worksheet.
 - The index number represents the position of the worksheet in the workbook. For example, to perform an operation on the worksheet at the third position in the workbook, enter 3 in the field.
 - The sheet name field is case insensitive.
4. Enter the name of the session that you used to open the source workbook in the Open action.
5. If the workbook contains more than one worksheet, mark the Specific Sheet option, then enter the index number or name of the destination worksheet.

6. Click Save.

Office 365 One Drive package

The One Drive package contains actions that enable you to automate many of the repetitive tasks in Microsoft cloud storage.

How to use the actions in the One Drive package

Perform the following actions within the One Drive package as part of using the set of available actions:

1. Use the Connect action to establish a connection to the Office 365 server.

See [Using the Connect action](#) on page 709.



Note: Office 365 packages do not currently support Multi-Factor Authentication or Single Sign-on.

2. Use a combination of actions available in this package to automate tasks.



Note: To use actions from other Office 365 packages, establish a connection using the Connect action from that package.

3. Use the Disconnect action to terminate the connection.

Actions in the One Drive package

Use the actions in the One Drive package to perform an operation on a single file or folder. To perform the operation on every file in a folder, use that action in a loop. See [Using One Drive actions in a loop](#) on page 733.

The One Drive package includes the following actions:

Action	Description
Check permission	Checks for read, write, or delete permission for a file or folder in your OneDrive. • Enter the user session that you provided in the Connect action. • Provide the file or folder name and path, file or folder link, or select a predefined string variable. • Specify which permission type to verify: Read or Read & Write. • Select a predefined Boolean type variable to hold the output, or click the icon on the right to create a new variable. The Boolean type variable will provide a true (user has permission) or false (user does not have permission) response.

Action	Description
Connect	Establishes a connection with the Office 365 server using your organization's client ID and tenant ID, and user credentials. See Using the Connect action on page 709.
Copy file or folder	Copies a file or folder from one folder to another in your OneDrive. - Enter the user session that you provided in the Connect action. - Select whether to copy a file or folder. - Provide the source and destination file/folder names and paths or file/folder link. Either enter the values or insert a string variable. To obtain the file or folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional. - Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.
Create folder	Creates a folder in a specific directory in your OneDrive. - Enter the user session that you provided in the Connect action. - Enter the parent folder name and path, or folder link. Either enter the values or insert a string variable. To obtain the folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter /Survey Results/Q1. - Enter the new folder name. Either enter the values or insert a string variable.

Action	Description
Delete file or folder	Deletes a file or folder in a specific directory in your OneDrive. • Enter the user session that you provided in the Connect action. • Select whether to delete a file or folder. • Provide the name and path, or file or folder link. Either enter the values or insert a string variable. To obtain the file or folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional.
Download file	Downloads a file from a specific directory in your OneDrive. • Enter the user session that you provided in the Connect action. • Provide the file name and path, or file link. Either enter the values or insert a predefined string variable. To obtain the file link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional. • Enter the destination folder path or select a predefined string variable. • Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.

Action	Description
Export as PDF	Exports an existing file in your OneDrive as a PDF. This action supports the following file extensions: doc, docx, oentry, odp, pps, ppt, pptx, tf, xls, and xlsx. • Enter the user session that you provided in the Connect action. • Provide the file name and path, or file link. Either enter the values or insert a predefined string variable. To obtain the file link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional. • Enter the export folder name and path or select a predefined string variable. • Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.

Action	Description
Find files and folders	Finds files and folders in a specific directory in your OneDrive. - Enter the user session that you provided in the Connect action. - Provide directory details in the Folder to search field: enter the folder name and path, or folder link. Either enter the values or insert a string variable. To obtain the folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter /Survey Results/Q1. - Specify whether to search for All items in folder or a Specific file (or folder).  Note: The Drive Item Name field accepts wildcard characters in the file name and extension. For example, to search for all documents with extension docx, enter *.docx in the Specific file (or folder) field. - Assign the output to a table variable. The variable will hold the following file or folder details: Name, ID, CreatedBy, CreationDate, LastModifiedBy, LastModificationDate, and ParentFolderPath.

Action	Description
Get file or folder information	Retrieves information for a specific file or folder from OneDrive. - Enter the user session that you provided in the Connect action. - Provide the file or folder name and path, or file/folder link. Either enter the values or insert a string variable. To obtain the file or folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional. - Assign the output to a record variable. The variable will hold the following file or folder details: Name, ID, CreatedBy, CreationDate, LastModifiedBy, LastModificationDate, and ParentFolderPath.

Action	Description
Move file or folder	Moves a file or folder from one folder to another in OneDrive. • Enter the user session that you provided in the Connect action. • Select whether to move a file or folder. • Provide the source and destination file or folder names and paths, or file/folder links. Either enter the values or insert a string variable into the two fields. To obtain the file or folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional. • Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.
Rename file or folder	Renames a file or folder in a specific directory in OneDrive. • Enter the user session that you provided in the Connect action. • Select whether to rename a file or folder. • Provide the current and new file or folder names, or file/folder link. Either enter the values or insert a string variable. • To obtain the file or folder link, copy the link generated from Share OneDrive files and folders • Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.

Action	Description
Restore last version	Restores a file to the last version. If you restore a file to its previous version, you will lose the current version. - Enter the user session that you provided in the Connect action. - Provide the file name and path, or file link. Either enter the values or insert a predefined string variable. To obtain the file or folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter /Accounts/SalesReport.xlsx.  Note: The forward slash that indicates that a file or folder is located in the root directory is optional.
Upload file	Uploads a file to a specific directory in OneDrive. - Enter the user session that you provided in the Connect action. - Provide the file name and path on the local directory. Either enter the values or insert a predefined string variable. For example, D:/Mydata/HR/EmployeeSurvey.xlsx. - Provide the upload folder name and path, or folder link. Either enter the values or insert a string variable. To obtain the folder link, copy the link generated from Share OneDrive files and folders For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter /Survey Results/Q1. - Optional: If there is file or folder with the same name in the destination folder, select the Override existing file/folder option which replaces the existing file or folder with the one being copied.

Using One Drive actions in a loop

Use the Find files and folder action to return a table of files and their properties inside of a specified folder, the Loop action to loop through each row in the table, and a One Drive action to perform an operation on every file in the table.

To perform an action on every file in a folder, do the following steps:

1. Double-click or drag One Drive > Find files and folders.
2. Provide your username with either a credential variable or an unencrypted value.
3. Enter the file path of the folder in which to perform the search.
4. Select the All items in folder option.
You can alternatively select Specific file (or folder) to limit the search to a specific folder on your OneDrive.
5. Select or create a table variable to hold the output.
The table variable holds information on files and folders in rows, under the following columns: name, id, createdBy, creationDate, lastModifiedBy, lastModificationDateTime, parentFolder, and Path.
6. Double-click or drag the Loop action.
7. Select the For each row in table iterator.
8. Select the table variable holding the output from step 5.
9. Select or create a record variable to temporarily hold each row.

Insert the action inside of the Loop container that you want to repeat on every file in the folder. This example uses the Download file action.

10. Double-click or drag Outlook > Download file.
11. Provide your username with either a credential variable or an unencrypted value.
12. Enter the following in the File name including path field, replacing the generic variable names with the names of the record variables from step 10:
`$RecordVariable[7]$/ $RecordVariable[0]$`
13. Enter the path to the folder where to download the files.
14. Click Save.

PDF package

Use the PDF package to automate various operations on a PDF file.

The PDF package enables you to perform the following tasks:

- Encrypt or decrypt a PDF file.
- Extract text from a PDF file.
- Convert a PDF file to an image.
- Merge several PDF files into a single file.
- Split a single PDF file into multiple files.

It is not necessary to have a PDF reader installed on your device.

Actions in the PDF package

The PDF package includes the following actions:

Action	Description
Decrypt document	See Using the Decrypt document action on page 738.
Encrypt document	See Using the Encrypt document action on page 734.
Extract field	See Using the Extract field action on page 735.
Extract image	See Using the Extract image action on page 736.
Extract text	See Using the Extract text action on page 735.
Get property	See Using the Get property action on page 738.
Merge documents	See Using the Merge documents action on page 739.
Split document	See Using the Split document action on page 739.

When an operation is performed on a PDF file, the file properties are stored in a dictionary variable. See [Using a dictionary variable for PDF properties](#) on page 740.

Using the Encrypt document action

Use the Encrypt document action to encrypt a PDF file.

To encrypt a PDF file, follow these steps:

1. In the Actions palette, double-click or drag the Encrypt document action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
4. In the User Permissions to Apply field, select the following operations:
 - Print: Allows users to print the document.
 - Modify: Allows users to edit the document.
 - Copy: Allows users to copy the document.
 - Form Fill: Allows users to fill a form in the document.
 - Document Assembly: Allows users to combine multiple PDF files, attach files, and so on.
 - Annotation: Allows users to apply annotations in the document.
 - Accessibility: Allows users to read text from the document using accessibility devices.
5. In the Encryption level, select the RC4 40-bit, RC4 128-bit, or AES 128-bit option to specify the encryption level.
6. In the Save encrypted PDF as field, specify a name and location for the encrypted file.
You must include the .pdf extension in the name of the encrypted file. For example, if the file name is `June_Quarter_report`, the .pdf extension is `June_Quarter_report.pdf`.
7. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

8. Optional: From the Assign PDF properties to a dictionary variable list, select a dictionary variable to hold the file properties.
For more information, see [Using a dictionary variable for PDF properties](#) on page 740.
9. Click Save.

Related tasks

[Using the Decrypt document action](#) on page 738

Use the Decrypt document action to decrypt a PDF file that is encrypted using the Encrypt document action.

Using the Extract field action

Use the Extract field action to extract fields from a PDF and assign it to variables.



Important: The Extract field action is available only for bots that are migrated from 11.x or 10.x. Do not use this action when creating new bots.

To extract fields from a PDF file, follow these steps:

1. In the Actions palette, double-click or drag the Extract field action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. From the File is protected field, select Yes if the file is encrypted and provide the User password or Owner password.
4. Click Add field to insert a new field.
Use Edit to update existing fields or Delete to remove the fields.
5. In the Extract field window, choose one of the following options:
 - Element to capture values of the selected fields.
The bot displays an error if the Element is not available in the PDF document.
 - Region to capture data based on the selected coordinates.
6. From the Save the output to a variable field, choose either a dictionary variable or multiple variables to hold the field values.
7. Click Save.

Using the Extract text action

Use the Extract text action to extract text from a PDF file and save it as a text file.

To extract text from a PDF file, follow these steps:

1. In the Actions palette, double-click or drag the Extract text action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.

- Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
 4. In the Text type field, select one of the following options:
 - Plain text: Enables you to extract the text and copy it to a text file.
It is similar to copying and pasting text from a PDF file to a text file.
 - Structured text: Enables you to preserve the original formatting of the extracted text from the PDF file.
 5. In the Page range field, select one of the following options:
 - All pages: Enables you to save all the pages in the PDF file as an image.
 - Pages: Enables you to enter the page numbers of the pages that you want to save as an image.
 6. In the Export data to text file field, specify a name and location for the text file.



Note: You must include the .txt extension in the name of the text file. For example, if the file name is `June_Quarter_report`, the .txt extension is `June_Quarter_report.txt`.

 7. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

 8. Optional: From the Assign PDF properties to a dictionary variable list, select a dictionary variable to hold the file properties.
For more information, see [Using a dictionary variable for PDF properties](#) on page 740.
 9. Click Save.

Using the Extract image action

Use the Using Extract image action to save a PDF file as an image.

To save a PDF file as an image, follow these steps:

1. In the Actions palette, double-click or drag the Extract image action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
4. In the Page range field, select one of the following options:
 - All pages: Enables you to save all the pages in the PDF file as an image.

- Pages: Enables you to enter the page numbers of the pages that you want to save as an image.
5. In the Type of image to be converted to list, select one of the following options to specify the format:
 - TIFF: If you selected this option, select an option from the TIFF compression type list.
 - NONE
 - LZE
 - RLE
 - CCITT Group 3
 - CCITT Group 4
 - BMP
 - JPEG: If you selected this option, in the JPEG quality field, enter a value (between 0 and 100) to specify the quality of the compressed image.
 - GIF
 - PNG
 - WMF
 - EMF
 - EXIF
 6. In the Folder path field, specify the location.
 7. In the File prefix field, enter a value.
The image files are suffixed with index numbers. For example, if you have specified `Report` as the File prefix, the name of the image files will be `Report_1`, `Report_2`, and so on.
 8. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

9. In the X Resolution (dpi) and Y Resolution (dpi) fields, specify the resolution.
10. In the Image output field, choose Color or Grayscale to specify the image output type:
 - a) In the Color property list, select an option.
 - True color (32 bits)
 - True color (24 bits)
 - High color (16 bits)
 - 56 color (8 bits)
 - 16 color (4 bits)
 - 2 color (1 bit, black/white)



Note: This option is available only with the Color image output type. Select this option only if RLE, CCITT Group 3, or CCITT Group 4 compression type is selected for the TIFF image format.

11. Optional: From the Assign PDF properties to a dictionary variable list, select a dictionary variable to hold the file properties.
For more information, see [Using a dictionary variable for PDF properties](#) on page 740.
12. Click Save.

Using the Decrypt document action

Use the Decrypt document action to decrypt a PDF file that is encrypted using the Encrypt document action.

To decrypt an encrypted PDF file, follow these steps:

1. In the Actions palette, double-click or drag the Decrypt document action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. Optional: In the User/Owner password field, enter a password to restrict access to the decrypted PDF file.
4. In the Save the decrypted PDF file as field, specify a name and location for the decrypted file. You must include the .pdf extension in the name of the decrypted file. For example, if the file name is `June_Quarter_report`, the .pdf extension is `June_Quarter_report.pdf`.
5. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

6. Optional: From the Assign PDF properties to a dictionary variable list, select a dictionary variable to hold the file properties.
For more information, see [Using a dictionary variable for PDF properties](#) on page 740.
7. Click Save.

Related tasks

[Using the Encrypt document action](#) on page 734

Use the Encrypt document action to encrypt a PDF file.

Using the Get property action

Use the Get property action to obtain the properties of the PDF document.

1. In the Actions palette, double-click or drag the Get property action from the PDF package.
2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. From the File is protected field, select Yes if the file is encrypted and provide the User password or Owner password.
4. From the Assign PDF properties to a dictionary variable field, choose either a dictionary variable or multiple variables to hold the field values.
To assign the output to a dictionary variable, map the PDF properties such as File, Author, Title, and Subject to the corresponding dictionary keys.
5. Click Save.

Using the Merge documents action

Use the Merge documents action to merge multiple PDF files into a single PDF file.

1. In the Actions palette, double-click or drag the Merge documents action from the PDF package.
2. Click Add PDF document to provide details on the first PDF file.
The Add PDF document window appears.
3. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
4. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
5. In the Page range field, select one of the following options:
 - All pages: Selects all the pages in the PDF file.
 - Pages: Enter the page numbers of the pages that you want to merge.



Note: If you entered 1-3, 5-7, 8, 10 or 10, 8, 5-7, 1-3 in 11.x, the output was pages 1,2,3,5,6,7,8,10. In A2019, if you enter the input as follows:

- In ascending order 1-3, 5-7, 8, 10, the output of the pages is 1,2,3,5,6,7,8,10
- In descending order 10, 8, 5-7, 1-3, the output of pages is 10,8,5,6,7,1,2,3

6. Click Yes, Add.
7. Repeat Steps 2 through 6 to provide details on additional PDF files.
To modify the details of, or delete a PDF file, open the actions menu (the vertical ellipsis to the right of the file).
8. Place the files in the order that they should appear in the merged file.
To move a file, open the actions menu. Then use the Move up or Move down options.
9. In the Output file path field, specify a name and location for the merged file.
You must include the .pdf extension in the name of the decrypted file. For example, if the file name is June_Quarter_report, the .pdf extension is June_Quarter_report.pdf.
10. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

11. Click Save.

Using the Split document action

Use the Split document action to split a PDF file into multiple files.

To split a PDF file into multiple files, follow these steps:

1. In the Actions palette, double-click or drag the Split document action from the PDF package.

2. In the PDF path, select one of the following options to specify the location of the PDF:
 - Control Room file: Enables you to select a PDF file that is available in a folder in the Enterprise Control Room.
 - Desktop profile: Enables you to select a PDF file that is available on your device.
 - Variable: Enables you to specify the file variable that contains the location of the PDF file.
3. Optional: In the User password or Owner password field, enter a password to restrict access to the encrypted PDF file.
 - User password: Allow users to perform specific operations on the encrypted PDF file.
 - Owner password: Allow users to use a password to open the file.
4. In the Output file creation options, select one of the following options to specify how to split the PDF file:
 - Number of pages per extracted PDF: Enables you to specify the number of pages each new file will contain. For example, you can enter 8 if you want each output file to contain only 8 pages.
 - Single file with selected pages: Enables you to create a single output file that contains the pages you have specified from the original file.
 - Blank page as a separator: Creates a new output file whenever a blank page is encountered in the original PDF file.
 - Bookmark level per file: Enables you to split the PDF file according to the bookmark level available in the file. For example, if a file contains three bookmark levels, you can split the PDF file based on these three levels.

If you selected this option, specify the bookmark level in the Bookmark Level field.

5. In the Folder path field, specify the location.
6. In the File prefix field, enter a value.
The image files are suffixed with index numbers. For example, if you have specified Report as the File prefix, the name of the image files will be Report_1, Report_2, and so on.
7. Select the Overwrite files with the same name check box to overwrite existing files with the same name.



Note: If this option is not selected and the bot encounters a file with the same name at the specified location, the bot will fail.

8. Optional: From the Assign PDF properties to a dictionary variable list, select a dictionary variable to hold the file properties.
For more information, see [Using a dictionary variable for PDF properties](#) on page 740.
9. Click Save.

Using a dictionary variable for PDF properties

When you automate a PDF-related task, Automation Anywhere Enterprise retrieves various properties of the file and stores the values of these properties in a dictionary variable.

Automation Anywhere Enterprise retrieves the PDF file name and extension, title, subject, and author. The file properties are stored in a dictionary variable within the following keys:

- pdfTitle
- pdfFilename
- pdfSubject
- pdfAuthor

The system automatically associates the properties of a PDF with the appropriate dictionary keys.

For example, if you create a dictionary variable Test and want to log the file name and author, you must enter `Test{pdfFilename}` and `Test{pdfAuthor}` in the appropriate fields.

PGP package

Use the PGP (Pretty Good Privacy) package to automatically encrypt and decrypt files for security.

The PGP package supports two types of encryption, symmetric (single key) and asymmetric (pair of keys) :

- PGP symmetric : Requires a single key to encrypt and decrypt files.
- PGP asymmetric: Requires PGP public and private key to encrypt and decrypt files.



Note: The system outputs an error when the proper file extension is not present in the path.

- Public key: File name specified for Public Key is not valid.
- Private key: File name specified for Private Key is not valid.

Actions in the PGP package

The PGP package includes the following actions:

Action	Description
Create keys	Creates a pair of public and private encryption keys. • In the Location to save public key file field, specify the path to the text file where to save the public key. • In the Location to save private key file field, specify the path to the text file where to save the private key. • Optional: In the Password to protect private key file field, select a credential variable or enter a value. • Optional: Select the Overwrite Files check box to replace files with the same name.
Decrypt files	Decrypts encrypted files. See Using the Decrypt files action on page 741
Encrypt files	Encrypts files to enable users to send them over the internet securely. See Using the Encrypt files action on page 742

Using the Decrypt files action

Use the Decrypt files action to retrieve the contents of encrypted files and folders.

To decrypt a file or folder, do the following steps:

1. Double-click or drag the Decrypt action from the PGP package.
2. Select either the Passphrase or Public key file encryption type.
 - If you have selected Passphrase, enter the value or select a credential variable.
 - If you have selected Private key file, provide the private key file path.

Optional: In the Password to protect private key file field, select a credential variable or enter a value.

3. In the Source folder/file(s) field, specify the folders or files to decrypt.
This field supports wildcard characters in the file name and extension. Use an asterisk (*) to substitute for one or more unknown alphanumeric characters or symbols.
4. In the Destination folder/file(s) field, specify the location where to save the decrypted folders and files.
This field supports wildcard characters in the file name and extension. Use an asterisk (*) to substitute for one or more unknown alphanumeric characters or symbols.
5. Select the Overwrite Files option to replace files with the same name.
6. Select the Remove file extension option and specify the extension name.
7. Click Save.

Using the Encrypt files action

Use the Encrypt files action to prepare files and folders to be shared securely.

To encrypt the files or folder using a public key, create a public-private key pair using the Create keys action.

To encrypt a file or folder, do the following steps:

1. Double-click or drag the Encrypt action from the PGP package.
2. Select either the Passphrase or Public key file encryption type.
 - If you have selected Passphrase, enter the value or select a credential variable.
 - If you have selected Public key file, provide the public key file path.
3. Select the Encryption algorithm.
Choose from:
 - AES128
 - AES192
 - AES256
 - Blowfish
 - CAST5
 - Idea
 - TripleDES
 - TwoFish256
4. In the Source folder/file(s) field, specify the folders or files to encrypt.
This field supports wildcard characters in the file name and extension. Use an asterisk (*) to substitute for one or more unknown alphanumeric characters or symbols.
For example:
 - Enter C:\PGP\encrypt*.csv to select the .csv files that start with the word encrypt.
 - Enter C:\PGP*encrypt*.* to select files of any extension that contain the word encrypt.
5. In the Destination folder/file(s) field, specify the location where to save the encrypted folders and files.
This field supports wildcard characters in the file name and extension. Use an asterisk (*) to substitute for one or more unknown alphanumeric characters or symbols.
6. Enter a value to append to the extension of the destination file.
7. Select the Overwrite Files check box to replace files with the same name.
8. Select the Compression type.
Choose from:

- None
- zip
- bzip2
- zlib

9. Select the Armor data (text output) check box to enable ASCII Armor output.
10. Click Save.

Play Sound package

The Play Sound package contains actions that enable you to play a beep sound and media file before or after an action is executed in a bot.

The Play Sound package includes the following actions:

Action	Description
Play beep	Plays a beep sound before or after an action is executed.
Play media file	Plays an audio file before or after an action is executed.  Note: Only .wav and .mp3 files are supported and do not require any media player installed on the device. Select any of the following tabs to specify the location of the media file: • Control Room file: Use a file that is available on the Enterprise Control Room. • Desktop file: Use a file that is available on a device. • Variable: Use a file variable to specify the file location.

Printer package

Use the actions in the Printer package to automate retrieving and setting the default printer.

Actions in the Printer package

The Printer package includes the following actions:

Action	Description
Get Default	Retrieves the default printer and assigns the value to a string variable.
Set Default	Sets the default printer.

Process package

The Process package contains a request action that enables the Enterprise Control Room user to use this action and configure their bots.

Before you start



Note: The Process package is now renamed to the AARI web package in Enterprise A2019.18 with the Create a Request action and additional new actions. See [AARI web package](#) on page 519.

Ensure you have met one of the following conditions in order to run this package:

Condition 1

- Access to a process in an assigned team.
- Access to AARI User license.
- A system-created AAE_Robotic_Interface User role for the AARI user.

Condition 2

- Access to a Bot Runner license (Attended or Unattended) or Bot Creator license.
- A user-created role with the View My Bots and Run My Bots permissions.

Actions in the Process package

The Process package includes the following action:

Action	Description
Create a Request	Creates a request. • In the Select Process field, select or upload your process. • Specify your variable in the Dictionary or Variable field. • Dictionary: Input your variable information in the Type, Key, and Value fields. In the Type field, you can choose between Any, String, Number, Datetime, or Boolean. • Optional: In the Add field, add more dictionary variables. • Variable: Enter your custom variable. • Optional: In the Assign the Request ID to field, assign a variable to store as an output. The output is stored as an ID value.

Prompt package

Use the Prompt package to accept an input value, a yes/no response, or to open a file or folder.

Actions in the Prompt package

The Prompt package includes the following actions:

Action	Description
For file	Prompts the user to input a value. - In the Prompt window caption field, enter a window caption. - In the Prompt message field, enter a message. - In the Assign the value to a variable field, specify a list variable.
For folder	Prompts the user to choose a folder. - In the Prompt window caption field, enter a window caption. - In the Prompt message field, enter a message. - In the Assign the value to a variable field, specify a variable.
For value	Prompts the user to enter a value. - In the Prompt window caption field, enter a window caption. - In the Prompt message field, enter a message. - In the Assign the value to a variable field, specify a variable.
For yes/no	Prompts the user to choose a Yes/No response. - In the Prompt window caption field, enter a window caption. - In the Prompt message field, enter a message. - In the Assign the value to a variable field, specify a variable.

Watch the following video on how to use the Prompt actions:

Related reference

[Message box package](#) on page 694

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: `Web Form Filled and Complete`.

Python Script package

The Python Script package contains actions that enable Python Script functions in a task.

Before you start

Ensure the following requirements are met before using the Python Script package:

- The appropriate version of Python is installed on the device on which you want to execute the script.



Note: Python versions 2.x and 3.x are supported.

- The "PATH" environment variable is updated to the path of the Python folder.

To verify if the Python environment variable is set correctly, enter `Python` in the command prompt. If it returns the Python version that is installed, the path environment is set up correctly.

Perform the following actions within the Python Script package as part of using the set of available actions:

1. Open a Python Script file, or manually enter the script you want to run using the Open action. You must associate the details of the file or script you want to run with a session name.
2. Run the script using the Execute function or the Execute script action.
 - If you uploaded a file containing the script, use the Execute script action.
 - If you manually input the script, use the Execute function action.

You must use the same Python Script session name established in the Open action.

3. Close the Python Script session after running the script.



Note: When you run a bot that contains Python Script actions, the script runs in the background.

To review the bot launcher logs, navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip`. Each zipped folder contains a file with data on the code execution, which is useful for debugging.

Actions in the Python Script package

The Python Script package includes the following actions:



Note: The Open action must be the first action to use the Python Script in a task. These actions can run a Python Script on Windows, Linux, and UNIX-based devices.

Action	Description
Close	Closes the session. Specify the same session name from the Open action.  Important: It is mandatory to close the session after the script is executed.

Action	Description
Execute function	Executes a function within the Python Script. - In the Python session field, specify a session name. Use the same session name from the Open action. - Optional: Specify the function name to run and the arguments to pass to the function.  Note: The interface allows you to select only one argument. Use a list variable to concatenate multiple arguments into one variable. - Optional: In the Assign the output to variable field, specify the variable. For an example, see Example of using Python script to join a list on page 893.
Execute script	Executes a script within the Python Script. - In the Python session field, specify a session name. Use the same session name from the Open action. - Optional: In the Assign the output to variable field, specify the variable. For an example, see Create a PDF using Python script on page 748.
Open	Opens a Python Script file. - In the Python session field, specify a session name. Use this same session name for other Python Script actions. - In the Python field, choose one of the following options: - In the Import existing file option, select an existing Python Script file.  Note: If you are uploading a script from a file on your desktop, the file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded. - In the Manual input option, enter the Python Script. - In the Python runtime version field, select 2 or 3 to specify the runtime version.  Note: Select the runtime version based on the version of Python installed on the device.

More resources

- Free A2019 bots that use Python from Bot Store
 - [Python Excel demo](#)
 - [A2019 - Speech to text using Python](#)
 - [A2019 - Run Python script](#)

- Developer content on automating with Python: [Automate with Python integration](#)
- Training course: [Training - Write inline scripts in a bot \(A-People login required\)](#)

Create a PDF using Python script

Build a bot that runs Python script from a file and generates a PDF.

- To run Python script from Enterprise A2019, you must already have the latest version of Python 3.x installed on your device.
- This example uses the FPDF library to generate the PDF. Therefore, install it before you start building this bot by copying and pasting the following line in the Windows command prompt:

```
pip install fpdf
```

See [FPDF project page](#).

1. Create a file in a standalone folder to hold the following Python script:
Insert your device username in the angle brackets.

```
from fpdf import FPDF
pdf = FPDF()
pdf.add_page()
pdf.set_font("Arial", size=12)
pdf.cell(200, 10, txt="Go Be Great!", ln=1, align="C")
pdf.output("C:/Users/<yourusername>/Desktop/sample_demo.pdf")
```



Note: If you are uploading a script from a file on your desktop, the file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded.

2. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
3. Provide the script with a Python Script > Open action:
 - a) Double-click or drag the Python Script > Open.
 - b) Select the Import existing file option.
 - c) Click Browse to select the .py file you created in Step 1.
4. Use a Python Script > Execute script action to tell the bot to run the script:
 - a) Double-click or drag Python Script > Execute script.
5. Close the script execution session with a Python Script > Close action:
 - a) Double-click or drag Python Script > Close.
 - b) Click Save.
6. Click the Run icon.

The bot creates a PDF on the desktop with the text Go Be Great!.

To review the bot launcher logs, navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip`. Each zipped folder contains a file with data on the code execution, which is useful for debugging.

If the bot does not create a file, change the last line in the Python script:

```
pdf.output(r"C:/Users/<yourusername>/Desktop/sample_demo.pdf")
```

Recorder package

Use the Capture action from the Recorder package to capture an interaction with a user interface (UI) object such as a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, and page tab. The Capture action replaces the Object Cloning command from Version 11.3.

The Capture action enables you to add a single interaction when building your bot (such as if you missed a step when recording a process). See [Using the Capture action](#) on page 758. For a common use case, see [Example of entering data into a web form from a worksheet](#) on page 890.

To record a process consisting of multiple steps, see [Record a task with the Universal Recorder](#) on page 838. To learn more about Universal Recorder capabilities, see [Universal Recorder for object-based automation](#) on page 836.

Object properties

When you select an object to capture, the Universal Recorder collects data on the object's properties in order to identify the object during run time. You can do the following with the object properties:

- Verify that the captured object properties match your intended object.

For example, when capturing a table from a website, ensure the Control Type and HTML Tag values are TABLE.

- Retrieve a property value.

For example, to retrieve the text of a link, use the Get property action and enter HTML InnerText in the Property name field.

- Specify the properties to search for. Mark the only the properties that will always resolve to true.

Actions

After capturing the object, specify the action for the bot to do to the object at run time. For example, when you capture a hyperlink, you can select to click the link or to retrieve the link text. To see table of all objects and possible actions, see [Actions performed on objects captured with Universal Recorder](#) on page 750.

Background processing

Background processing enables an automation to run in the background. Use it in recorded tasks that use Citrix Virtual Apps and Windows native applications. Some packages, such as the Excel basic and Excel advanced inherently support background processing. The following actions support background processing:

- Click

- Set Text
- Get Text

Secure Recording

When secure recording mode is enabled, bots do not capture object images or values. This ensures that sensitive data is not stored in the bots.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#) on page 1131.

Proxy support

If your device is configured with a proxy, all outbound requests from this package are routed through the proxy server. See [Connect Bot agent to a device with a proxy](#) on page 415.



Example: [Example of extracting data from a web table](#) on page 888

Actions performed on objects captured with Universal Recorder

After capturing the object, specify the action for the bot to do to the object at run time. For example, when you capture a hyperlink, you can select to click the link or to retrieve the link text. Refer to the table below for the objects and their possible actions.

Object	Actions
Button	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Click • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
Checkbox	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get status: retrieves whether the check box is selected. Returns checked or unchecked. • Check • Uncheck • Set focus • Toggle: switches the check box to the opposite status. For example, if the check box is checked, use the Toggle action to clear it. • Left click: use this action if the Toggle action does not work during Runtime. • Right click • Double click

Object	Actions
Client	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get all children names • Get all children values • Set text: enters text into the UI object. It supports credentials. Credentials and credential variables in the Bot editor on page 878 • Click • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
ComboBox (appears as a drop-down list)	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get total items: retrieves the number of items in the box. • Get selected index: retrieves the item's position in the menu.  Note: Item index counts start at 1. • Get selected item key: retrieves the key of the selected item. • Get selected text: retrieves the data from the selected item. • Select item by index: selects the item that is located at the specified index.  Note: Item index counts start at 1. • Select item by text selects the item that matches the specified text.  Note: The Assign value field is case-sensitive. • Set focus • Expand • Click • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click

Object	Actions
GridView (SAP only)	- Click on cell by index  Note: Index count starts at 1. - Double click current cell - Get total rows: retrieves the number of rows that contain values. - Get total columns: retrieves the number of columns that contain values. - Get cell text by index: retrieves the data in the specified cell located at the row and column index.  Note: Row and column index counts start at 1. For example, to retrieve the data in cell A2, enter 1 in the Row field and 2 in the Column field. - Get cell index by text: retrieves the index of the cell containing the specified text.  Note: The Cell Text field is case-sensitive. - Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Get table: retrieves the table data and saves it to a Table variable. For more information, see Example of extracting data from a web table on page 888. - Select all - Set cell by index: enters text into the cell located at the row and column index.  Note: Row and column index counts start at 1. For example, to enter text into cell A2, enter 1 in the Row field and 2 in the Column field. - Set cell by text: enters text into the cell containing the specified text.  Note: The Find Text field is case-sensitive. - Set current cell - Set current row - Set focus - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click

Object	Actions
Label	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Set focus • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
Link	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Click • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
ListView	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get total items: retrieves the number of items in the list. • Get selected index: retrieves the item's position in the menu.  Note: Item index counts start at 1. • Get selected text: retrieves the data from the selected item. • Select item by index: selects the item that is located at the specified index.  Note: Item index counts start at 1. • Select item by text selects the item that matches the specified text.  Note: The Assign value field is case-sensitive. • Click • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click

Object	Actions
Main window	• Get focus control id: retrieves the ID of the control that is in focus. • Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Set focus • Send key • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
Menu	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get total items: retrieves the number of items in the menu. • Get selected index: retrieves the item's position in the menu.  Note: Item index counts start at 1. • Get selected text: retrieves the data from the selected item. • Select item by index: selects the item that is located at the specified index.  Note: Item index counts start at 1. • Select item by text selects the item that matches the specified text.  Note: The Assign value field is case-sensitive. • Set focus • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click

Object	Actions
Page Tab	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Get total items: retrieves the number of items in the tab. - Get selected index: retrieves the item's position in the menu.  Note: Item index counts start at 1. - Get selected text: retrieves the data from the selected item. - Select item by index: selects the item that is located at the specified index.  Note: Item index counts start at 1. - Select item by text selects the item that matches the specified text.  Note: The Assign value field is case-sensitive. - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click
RadioButton	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Get status: retrieves whether the radio button is selected. Returns selected or deselected. - Select - Set focus - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click
Shell	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click
Slider	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Set position - Right click - Double click

Object	Actions
Tab	• Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Scroll left • Select • Set focus • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click
Table	• Deselect all • Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. • Get cell text by index: retrieves the data in the specified cell located at the row and column index.  Note: Row and column index counts start at 1. For example, to retrieve the data in cell A2, enter 1 in the Row field and 2 in the Column field. • Get cell index by text: retrieves the index of the cell containing the specified text.  Note: The Cell Text field is case-sensitive. • Get table: retrieves the table data and saves it to a Table variable. For more information, see Example of extracting data from a web table on page 888. • Get total rows: retrieves the number of rows that contain values. • Get total columns: retrieves the number of columns that contain values. • Select row • Select all • Set cell by index: enters text into the cell located at the row and column index.  Note: Row and column index counts start at 1. For example, to enter text into cell A2, enter 1 in the Row field and 2 in the Column field. • Set cell by text: enters text into the cell containing the specified text.  Note: The Find Text field is case-sensitive. • Set focus • Left click: use this action if the Click action does not work during Runtime. • Right click • Double click

Object	Actions
TextBox	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Set focus - Set text: enters text into the UI object. It supports credentials. Credentials and credential variables in the Bot editor on page 878 - Append text: adds text to the end of existing text in the field, instead of overwriting it. - Click - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click
Toolbar	- Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click
Tree (Control is displayed as a ListView)	- Expand node: expands the current node to down to the next level of nodes. - Get property: retrieves the value of the specified object property (such as the link text) and optionally saves it to a variable. For more information, see the Object properties section. - Get total items: retrieves the number of items in the tree. - Get selected index: retrieves the item's position in the menu.  Note: Item index counts start at 1. - Get selected text: retrieves the data from the selected item. - Select item by index: selects the item that is located at the specified index.  Note: Item index counts start at 1. - Select item by text selects the item that matches the specified text.  Note: The Assign value field is case-sensitive. - Set focus - Left click: use this action if the Click action does not work during Runtime. - Right click - Double click

Using the Capture action

Use the Capture action to capture a single interaction (click, keystroke, or mouse movement) with an object control including a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, or page tab.

- To use the Recorder, you must already have done the following:

- [Install Bot agent and register device](#) on page 400
- [Set user device credentials](#) on page 415

- Configure device display and font scale to 100%.

If you are using Recorder package version 2.0.6-20200626-193519 or later, you can record tasks in Google Chrome, Internet Explorer, Java, Microsoft Active Accessibility, and Microsoft UI automation applications on a computer that has display scale configured to 100%, 125%, or 150%.

- If you are automating a task using a browser, configure the zoom level to 100%.

If you are using Recorder package version 2.0.6-20200626-193519 or later, you can record tasks in a Google Chrome browser that does not have a zoom level setting of 100%.

- If you are automating a task using a Google Chrome browser, ensure that the Automation Anywhere plug-in that corresponds with the Enterprise A2019 build version is enabled.

[Supported browsers for Enterprise A2019](#) on page 307

Considerations when recording a task:

- Use clicks when possible rather than shortcut keys.
- If you are automating a task using a browser, do not use autofill to enter values into fields.
- Record the task at low speed.
- Avoid dragging windows during the recording process.
- Avoid clicking on applications that are not part of the process you are recording and automating.
- When Internet Explorer is used, the action waits until the browser is completely rendered and is in a ready state before executing the action.

To record a single interaction with an object control, follow these steps:

1. Double-click or drag Recorder > Capture.
2. Specify the window in which to capture an object.
Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

3. Optional: Insert a wildcard character (*) in the window title that is subject to change, such as for online invoices.

For example, `Sample* - Google Chrome`.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the

Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad)` for all the window title names starting with `((\w*) -Notepad)`, or use Pattern such as `((\w*) \s) *document-Notepad` for only those window titles that match this pattern.



Note: During runtime, verify that the TaskBot identifies the correct window. If it does not, do the following:

- a. Open the application or browser window.
- b. Drag a Window > Get active window title action above the Recorder > Capture action.
- c. Insert a string variable into the Assign the window title to variable field.
- d. Drag a Window > Set title action below the Window > Get active window title action.
- e. In the Window field, insert the window variable generated by the Recorder > Capture action.
- f. In the New window title field, insert the string variable from the Get active window title action.
- g. Click Save.

4. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

5. Click Capture object.

The selected window appears.

6. Click the object control, for example, a button, form field, or a table.

A box highlights the control when you mouse over it.



Note: If the box does not appear and you are capturing in the Google Chrome browser, verify that you have enabled the Automation Anywhere Google Chrome extension. See [Google Chrome browser extension requirements](#) on page 308.

7. Review the Object properties table.

The bot uses the selected properties to identify the object control at runtime.

- a) Verify that the Control Type matches your intended object.

For example, when capturing a table from a website, ensure the Control Type and HTML Tag values are TABLE.

If the Control Type does not match your intended object, recapture the object control.

- b) Select and assign values to the object properties that you want to include in the object search.

For a more reliable bot, we recommend that you select only the properties that have static values (such as Name, Class, Type, HTML ID, and DOMXPath), and deselect the properties that have dynamic values (such as HTML Href, Path or Value), which are subject to change and cause bot errors.

You can use the wild card character (*) and variables in object property values to re-use the same action to capture different objects in different scenarios.

8. Select the Action from the drop-down list.

For a full list of possible actions by object, see [Actions performed on objects captured with Universal Recorder](#) on page 750.

- If you record a click and keystrokes in a text box with a Control Type of `PASSWORD_TEXT`, the Recorder does not capture the keystrokes entered into the field. Instead, the action selects the Set text option and offers options to securely input the password. We recommend that you store the password in the Credential Vault and insert it into the action as a credential. [Credentials and credential variables in the Bot editor](#) on page 878

If you navigate to the text box using the TAB keystroke instead of a click in an MSAA or SAP application, the Recorder is able to identify fields with a Control Type of `PASSWORD_TEXT`.

- If the selected Action supports background processing, a Run in the background option appears. [Background processing](#) on page 837

9. Optional: Enter a value in the Wait for control field to specify the number of milliseconds the bot must wait for the object control to appear on the application window.

We recommend setting a delay time when using the Set text action to enter keystrokes into a text field.

10. Optional: Assign the output to a variable.

11. Click Save.

The captured images are not added as dependencies and will not be displayed in the dependencies list when you check in your bot.

Watch the following video on how to use the Capture action:

REST Web Service package

Use the actions in the REST Web Service package as methods (DELETE, GET, PATCH, POST, or PUT) to send requests to and receive responses from an API.

Working with REST Web Service actions

Provide the following information to send a REST request and receive a response. Not all parameters are required for all methods.

- URI: A unique address for an API resource.
- Authentication Mode: There are three supported authentication modes:
 - Basic: Text strings can be used for basic authentication.
 - Logged-in AD User: Active Directory (AD) users that are authorized to access the related API are authenticated through AD. No credentials are required in the request.
 - Windows NT LAN Manager (NTLM) Authentication (AD User): A challenge/response authentication method that allows clients to provide their user name and password as encrypted credentials or plain text. We recommend that you use credentials that are stored in the Automation Anywhere Credential Vault.
- Header: Not all methods require a header. Headers represent the metadata associated with the request.



Note: To use an API key in your request, enter `api_key` in the header Name field, and the key value in the Value field.

- Capture failure response: Select the check box to capture the failure response except for the Success/Ok response. The failure response details are captured in the response body.
- Content type: When a header contains a content type, it defines the content negotiation between the client and the server. REST Web Service actions support the following content types:
 - application/json
 - application/xml
 - text/plain
 - text/html
 - text/xml
- Output variable: The response output is captured in a dictionary variable. A dictionary variable is a key-value pair. Use the response header name as key to return the header value, or "Body" as the key to return the response body.



Note: The response key with its value is available in the dictionary variable to display the response status of the REST API.

To obtain a list of the header names for the API resource, perform these steps:

1. Insert a Loop action after the REST Web Service action.
2. Select the For each key in the dictionary iterator.
3. In the Dictionary variable field, select the variable that holds the REST Web Service action output.
4. Assign the value of each key to `$prompt-assignment$`.
5. Insert a Log To File action.
6. Provide the file path to a text file to hold the list of header names.
7. Insert `$prompt-assignment$` in the Enter text to log field.
8. Select the Overwrite existing file option.
9. Click Save.

When you run the bot, it prints the header names from the API resource to the selected file.

Passing values securely

You can securely pass values from the Credential Vault to the web service by specifying the locker, credential, and attribute in the following supported action fields:

- URI
- Custom headers
- Body: For the `application/x-www-form-urlencoded` content type, click Add parameter to select the value from the Credential Vault.

For all other content types, select the Select credential as parameters option and click Pick.

Actions in the REST Web Service package

Action	Description
Delete method	Removes the resource that is identified by the URI.
Get method	Retrieves information identified by parameters included in the URI. There is no Content type for the GET method because all the parameters are passed as part of the URI. Limitations and characteristics of the GET method include the following: • URI length is limited to 2048 characters. • All parameters are passed in the URI. • The GET method exposes data that is in the URI, making it less secure than the POST method. • GET does not change any data, making it safe for all users regardless of authorization.
Patch method	Modifies the resource that is identified by the URI.
Post method	Creates a new resource in the URI. • Parameters are passed in request body. • There is no limit on length for a request body.
Put method	Updates or replaces a resource based on parameters passed in the URI or body.

Proxy support

If your device is configured with a proxy, all outbound requests from this package are routed through the proxy server. See [Connect Bot agent to a device with a proxy](#) on page 415.

Related tasks

[Example of building a bot that uses credential variables](#) on page 881

Securely pass values to a bot using credential variables to automate the process of logging in to a bank website.

Related reference

[Credentials and credential variables in the Bot editor](#) on page 878

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

Example of using REST Web Service actions

Use the Get method, Post method, and Put method actions from the REST Web Service package to send requests to and receive responses from a REST API. In this example, you retrieve a list of all the available inventory, place an order for an item, and then update the item status to "sold".

This example uses endpoints from the Swagger Petstore sample API to demonstrate how to use the actions to send requests and retrieve the response body.

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.

- b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Use the Get method action to retrieve a list of all the available pets.
 - a) Double-click or drag the REST Web Services > Get method action.
 - b) Enter the following URI:


```
https://petstore.swagger.io/v2/pet/findByStatus?status=available
```
 - c) Provide authorization details in the Custom headers table.
 1. In the Name column, enter `api_key`.
 2. In the Value column, enter `special-key`.
 - d) Create the variable `dOutput` in the Assign the output to a variable field.
3. Insert a Log to file action to see the response body.
 - a) Double-click or drag the Log to file action.
 - b) Provide the file path to a text file.
 - c) In the Enter text to log field, enter `$Output {Body} $`.
4. Click Save and then click Run.
The bot retrieves the response body and saves it to the text file.
5. Disable the Log to file action.
6. Use the Post method action to place an order for a pet.
 - a) Double-click or drag the REST Web Services > Post method action.
 - b) Enter the following URI:


```
https://petstore.swagger.io/v2/store/order
```
 - c) Provide authorization details in the Custom headers table.
 1. In the Name column, enter `api_key`.
 2. In the Value column, enter `special-key`.
 - d) Open the log file and copy the Pet ID of the first entry.
 - e) Copy and paste the following into the Custom parameters field, replacing the text in the angle brackets with the value that you copied from the file:

```
{
  "petId": <PetID>,
  "quantity": 1,
  "shipDate": "2020-06-10T17:32:54.219Z",
  "status": "placed",
  "complete": true
}
```


- f) Insert the variable `dOutput` in the Assign the output to a variable field.
7. Insert a Message box action to see the response body.
 - a) Double-click or drag the Message box action.
 - b) Provide the file path to a text file.
 - c) In the Enter text to log field, enter `$Output {Body} $`.
8. Click Save and then click Run.
The bot retrieves the response body and prints it to the Message box. A successful response includes `"status": "placed", "complete": true`.
9. Use the Put method action to update the pet name to "Pluto" and pet status to "sold".
 - a) Double-click or drag the REST Web Services > Put method action.
 - b) Enter the following URI:


```
https://petstore.swagger.io/v2/pet
```
 - c) Provide authorization details in the Custom headers table.
 1. In the Name column, enter `api_key`.
 2. In the Value column, enter `special-key`.
 - d) Activate the log file and copy the Pet ID of the first entry.
 - e) Copy and paste the following into the Custom parameters field, replacing the text in the angle brackets with the value that you copied from the file:


```
{
  "petId": <PetID>,
  "name": "Pluto",
  "status": "sold"
}
```
 - f) Insert the variable `dOutput` in the Assign the output to a variable field.
10. Move the Message box action below the Put method action:
 - a) Double-click or drag the Message box action.
 - b) Provide a file path to a text file.
 - c) In the Enter text to log field, enter `$Output {Body} $`.
11. Click Save and then click Run.
The bot retrieves the response body and prints it to the Message box. A successful response includes `"name": "Pluto", "status": "sold"`.

SAP package

The SAP package contains actions to automate tasks and processes on a SAP application.

The SAP package enables you to perform the following tasks:

- Reduce the time required to combine data from disparate systems.
- Eliminate human error and increase efficiency.

- Increase the number of transactions processed.
- Deliver real-time information to various stakeholders.
- Enhance decision-making through comprehensive reports.



Note: You can use the actions in the SAP package with any version of SAP ECC and Oracle Database.

Prerequisites

- Open the Enterprise client and SAP GUI application in the same mode. For example, if you open the Enterprise client in Administrator mode, you must also open the SAP GUI application in Administrator mode.
- Log in to the SAP GUI before capturing objects because the SAP Logon screen is not supported for object capture.
- Enable GUI scripting and accessibility.
See [Enabling Scripting on the Client Side](#), [Enabling Scripting on the Server Side](#), and [Enabling Accessibility settings](#).
- Ensure that one of the following SAP GUI for Windows is installed on the devices that you use to automate SAP-related tasks and to run these tasks:
 - SAP GUI 750 with patch 9
 - SAP GUI 760 with patch 0
 - SAP GUI 760 with patch 5
- Install a Scripting Tracker or a similar tool to retrieve the field path of the SAP object.

Before you start

Perform the following actions within the SAP package as part of using the set of available actions:

1. Establish a connection with the SAP application using the Connect action.
Log in to the SAP application using the SAP GUI application. Then use the Connect action from the SAP package to use this connection and assign a session name. Use this same session name for the other actions.
2. Use the actions to automate a task.
3. After you have automated all the SAP-related tasks, terminate the connection to the SAP application using the Disconnect action.

Actions in the SAP package

The SAP package includes the following actions:

Action	Description
Check/uncheck checkbox	Selects or clears a check box. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object. - In the Action option, select Check, Uncheck, or Toggle.
Click	Performs a click operation. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object.
Click menu	Clicks a menu item by text or index. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object. - In the Select option, select Name or Index to specify the name or index of the menu item.
Connect	See Using Connect action for SAP on page 770.
Disconnect	Terminates the connection to the SAP application. In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.
Double click	Performs a double-click operation. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object.
Expand	Expands the item by text or index. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object. - In the Select option, select Text or Index to specify the text or index of the item.
Export table	See Using Export table action on page 770.

Action	Description
Get cell count	Gets number of cells in a table or grid. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.
Get children name	Gets children control names. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to list variable field, specify the list variable.
Get children text	Gets the text associated with children control. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to list variable field, specify the list variable.
Get column count	Gets number of columns in a table or grid. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.
Get row count	Gets number of rows in a table or grid. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.
Get selected item	Gets selected item index from a combo box, page tab, or a tree view control. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.

Action	Description
Get status	Gets status of a radio button or check box. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.
Get table cell index	Gets table cell index for text. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Search text field, specify the text. • Select the Case sensitive search option to specify a case-sensitive search. • Select the All occurrences check box. • In the Assign the output to a variable field, specify the variable.
Get table cell text	Gets table cell text by index. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Row field, specify the number of row from which you want to get the text. • In the Column field, specify the number of column from which you want to get the text. • In the Assign the output to a variable field, specify the variable.
Get text	Gets text from a text box, label, or status bar. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.
Get total item	Gets total item from a combo box, page tab, or tree view control. • In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. • In the Field path field, specify the location or a string variable that contains the location of the object. • In the Assign the output to a variable field, specify the variable.

Action	Description
Left click	Performs a left-click operation. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object.
Right click	Performs a right-click operation. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object.
Select item	Selects an item by text or index. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object. - In the Select option, select Text or Index to specify the text or index of the item.
Select radio option	Selects a radio button. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object.
Send virtual key	Sends a virtual key. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Select list, select a key. See Virtual keys in SAP GUI.
Set table cell text	See Set table cell text .
Set text	Sets the text in an editable field. - In the Session name field, enter the session name you used to connect to the SAP application in the Connect action. - In the Field path field, specify the location or a string variable that contains the location of the object. - In the Field value field, specify the text. - Select the Append text check box.

Using Connect action for SAP

Use the Connect action to establish a connection with a SAP system that you want to use to automate SAP-related tasks. This must be the first action you use to automate an SAP-related task.

1. In the Actions palette, double-click or drag the Connect action from the SAP package.
2. In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.
3. Select an option to specify the connection type:
 - a) If you have selected Automatic, no additional information is required to connect to the SAP application.
You must be already logged on to SAP logon application as the system uses the available SAP session to connect to a SAP system.
 - b) If you have selected SAP GUI, you must manually provide the following details:
 - Name: Specify the value in the Name field. The value must be same as entered in the Description field of the SAP logon system connection parameters.
 - Client: Specify a value for the client identifier. You can enter a value of 0 through 999.
 - User name: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually.
 - Password: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually.
 - Language: Specify the two-letter code for the language set on the SAP server.
4. Click Save.

Related tasks

[Using Export table action](#) on page 770

Use the Export table action to export a table to a datatable or CSV file.

[Using Set table cell text action](#) on page 771

Use the Set table cell text action to set the text in a specific cell of a table or a grid.

Related reference

[SAP package](#) on page 764

The SAP package contains actions to automate tasks and processes on a SAP application.

Using Export table action

Use the Export table action to export a table to a datatable or CSV file.

To export a table, follow these steps:

1. In the Actions palette, double-click or drag the Export table action from the SAP package.
2. In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.
3. In the Field path field, specify the location or a string variable that contains the location of the object.
4. In the Export As option, select CSV or Datatable to specify the export option of the table cell:

Choice	Steps
CSV	- In the File Path field, specify the location or file variable. - Optional: In the Encoding field, specify the value. - Select the Export data with header check box to export with header. - In the When saving field, select Append to existing log file or Overwrite existing log file to append the log file or overwrite the content within the log file.
Datatable	In the Datatable field, specify the value.

- Click Save.

Using Set table cell text action

Use the Set table cell text action to set the text in a specific cell of a table or a grid.

To set a value in a table cell, follow these steps:

- In the Actions palette, double-click or drag the Set table cell text action from the SAP package.
- In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.
- In the Field path field, specify the location or a string variable that contains the location of the object.
- In the Select option, select Text or Index to specify the text or index of the table cell:
 - Text: In the Find Text field, specify the value.
The system searches for the cell that contains the value.
 - Index: In the Row and Column fields, specify the value.
- In the Set Text field, enter the text to set the table cell.
- Click Save.

Actions supported in various SAP versions

Review the information about the various actions that are supported with 11.x and Enterprise A2019 and which SAP GUI versions support them.

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Text box	Set Text	Set Text	Yes	Yes	Yes	Yes
	Append Text	Append Text	Yes	Yes	Yes	Yes
	Get Property	Get Property	Yes	Yes	--	Yes
	Set Focus	Set Focus	Yes	Yes	Yes	Yes
	Left Click	Left Click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
	Double-click	Double-click	Yes	Yes	--	Yes
Combo box	Select item by index	Select item by index	No	Yes	Yes	Yes
	Select item by text	Select item by text	No	Yes	Yes	Yes
	Select item by key	Select item by key	Yes	Yes	Yes	Yes
	Expand		Yes	Yes	--	Yes
	Get total items	Get total items	No	Yes	Yes	Yes
	Get selected text	Get selected item text	No	Yes	Yes	Yes
	Get selected item key	Get selected item key	Yes	Yes	Yes	Yes
	Get selected index	Get selected item index	No	Yes	--	Yes
	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
Check box	Check	Check	Yes	Yes	--	Yes
	Uncheck	Uncheck	Yes	Yes	--	Yes
	Toggle	Toggle	Yes	Yes	--	Yes
	Get status	Get status	Yes	Yes	--	Yes
	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
Button	Click	Click	No	No	NA	No
	Get property	Get property	Yes	Yes	--	Yes
	Left click	Left click	Yes	Yes	Yes	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Radio button	Select	Select	Yes	Yes	Yes	Yes
	Get status	Get status	Yes	Yes	Yes	Yes
	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
Table	Set cell by index	Set cell by index	Yes	Yes	--	Yes
	Set cell by text		Yes	Yes	--	Yes
	Get cell text by index	Get cell text by index	Yes	Yes	--	Yes
	Get cell index by text		Yes	Yes	--	Yes
	Get total rows	Get total rows	Yes	Yes	--	Yes
	Get total columns	Get total columns	Yes	Yes	--	Yes
		Select row	--	--	--	--
		Export to CSV	--	--	--	--
	Get property	Get property	Yes	Yes	--	Yes
		Set focus	--	--	--	--
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
	Get Table		Yes	Yes	--	Yes
	Click		No	No	--	No
Menu bar	Select item by text	Select item by text	Yes	Yes	Yes	Yes
	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
		Double-click	--	--	--	--

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
	Get total items		Yes	Yes	--	Yes
	Select item by index		Yes	Yes	--	Yes
	Select item by text		No	No	--	No
Tree	Expand node	Expand node	Yes	Yes	Yes	Yes
		Select node by text	--	--	--	--
	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Get total items		Yes	Yes	--	Yes
	Get selected index		Yes	Yes	--	Yes
	Get selected text		Yes	Yes	--	Yes
	Select item by index		Yes	Yes	--	Yes
	Select item by text		Yes	Yes	--	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
Tab	Select	Select	Yes	Yes	Yes	Yes
	Scroll Left	Scroll to left	Yes	Yes	Yes	Yes
	Get property	Get property	Yes	Yes	Yes	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	Yes	Yes
	Right-click	Right-click	Yes	Yes	Yes	Yes
	Double-click	Double-click	Yes	Yes	Yes	Yes
Grid view		Select all	--	--	--	--
	Select cell by index	Select cell by index	Yes	Yes	--	Yes
	Select cell by text		Yes	Yes	--	Yes

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
		Set current row	--	--	--	--
		Select row	--	--	--	--
		Click cell by index	--	--	--	--
		Double-click current cell	--	--	--	--
	Get total rows	Get total rows	Yes	Yes	--	Yes
	Get total columns	Get total columns	Yes	Yes	--	Yes
	Get cell by index	Get cell by index	Yes	Yes	--	Yes
	Get cell index by text		Yes	Yes	--	Yes
		Export to CSV	--	--	--	--
	Get property	Get property	Yes	Yes	--	Yes
		Set focus	--	--	--	--
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
	Click		No	No	--	No
	Get table		Yes	Yes	--	Yes
Main window		Send key	--	--	--	--
		Close window	--	--	--	--
		Maximize window	--	--	--	--
		Activate window	--	--	--	--
		Restore window	--	--	--	--
		Execute scripts	--	--	--	--
		Get focus control ID	--	--	--	--
	Get property	Get property	--	--	--	--

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
		Set focus	--	--	--	--
	Left click	Left click	--	--	--	--
	Right-click	Right-click	--	--	--	--
	Double-click	Double-click	--	--	--	--
Toolbar		Press button	--	--	--	--
		Select context-menu item by text	--	--	--	--
	Get property	Get property	Yes	Yes	--	Yes
		Set focus	--	--	--	--
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
	Click		No	No	--	No
Label	Get property	Get property	Yes	Yes	--	Yes
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	Yes	Yes	--	Yes
	Right-click	Right-click	Yes	Yes	--	Yes
	Double-click	Double-click	Yes	Yes	--	Yes
	Click	Click	No	No	--	No
Rest of the control (It includes controls such as: GuiMainWindow, GuiBox, GuiUserArea, GuiTitlebar, and GuiStatusbar)	Get property	Get property	--	--	--	--
	Set focus	Set focus	Yes	Yes	Yes	Yes
	Left click	Left click	--	--	--	--
	Right-click	Right-click	--	--	--	--
	Double-click	Double-click	--	--	--	--

Screen package

Use the Screen package to automate the process of capturing screenshots. Using the actions in this package, you can capture an area of an application window, the entire computer screen, or an active open window and save it in a specified location in an image format.

Actions in the Screen package

The Screen package includes the following actions:

Action	Description
Capture area	Captures specified area of an open application. See Using Capture area action on page 777
Capture desktop	Captures an image of the full desktop. - In the File path to save image field, specify the path where you want to save the captured image. The following file extensions are supported: png, bmp, jpeg, tiff, gif, and wmf. - Select Overwrite file check box to overwrite an existing file with the same name.
Capture window	Captures screenshots of an open application window. See Using Capture window action on page 779

Secure Recording

When secure recording mode is enabled, bots do not capture object images or values. This ensures that sensitive data is not stored in the bots.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#) on page 1131.

Using Capture area action

Use the Capture area action in the Screen package to capture a screenshot of the application window area.

To capture a specified area of an application window, perform these steps:

1. In the Actions palette, double-click or drag the Capture area action from the Screen package.
2. Specify the window in which to capture an object.

Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.

Option	Description
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

3. Optional: Insert a wildcard character (*) in the window title that is subject to change, such as for online invoices.

For example, `Sample* - Google Chrome`.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) - Notepad` for all the window title names starting with `((\w*) - Notepad`, or use Pattern such as `((\w*)\s)*document - Notepad` for only those window titles that match this pattern.



Note: During runtime, verify that the TaskBot identifies the correct window. If it does not, do the following:

- Open the application or browser window.
- Drag a Window > Get active window title action above the Recorder > Capture action.
- Insert a string variable into the Assign the window title to variable field.
- Drag a Window > Set title action below the Window > Get active window title action.
- In the Window field, insert the window variable generated by the Recorder > Capture action.
- In the New window title field, insert the string variable from the Get active window title action.
- Click Save.

4. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

5. Click the Capture region.

The pixel coordinates of the captured area are displayed in the X, Y, Width, and Height fields. You can modify these values.

6. Browse to select the File path to save image.

The following file extensions are supported: png, bmp, jpeg, tiff, gif, and wmf.

7. Click Overwrite file to replace an existing file with the same name.

8. Click Save.

Using Capture window action

Use the Capture window action of the Screen package to capture an open application window.

To capture an application window, perform these steps:

1. In the Actions palette, double-click or drag the Capture window action from the Screen package.
2. Specify the window in which to capture an object.

Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

3. Optional: Insert a wildcard character (*) in the window title that is subject to change, such as for online invoices.

For example, `Sample* - Google Chrome`.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) - Notepad` for all the window title names starting with `((\w*) - Notepad`, or use Pattern such as `((\w*)\s)*document - Notepad` for only those window titles that match this pattern.



Note: During runtime, verify that the TaskBot identifies the correct window. If it does not, do the following:

- a. Open the application or browser window.
- b. Drag a Window > Get active window title action above the Recorder > Capture action.
- c. Insert a string variable into the Assign the window title to variable field.
- d. Drag a Window > Set title action below the Window > Get active window title action.
- e. In the Window field, insert the window variable generated by the Recorder > Capture action.
- f. In the New window title field, insert the string variable from the Get active window title action.
- g. Click Save.

4. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.

- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

5. Browse to select the File path to save image.
The following file extensions are supported: png, bmp, jpeg, tiff, gif, and wmf.
6. Click Overwrite file to replace an existing file with the same name.
7. Click Save.

Service package

Use the Service package to automate operations in Windows and application services including starting, stopping, pausing, resuming, or getting the status of services.



Note: You must have administrator privileges to start, stop, pause, or resume service operations.

Actions in the Services package

The Services package includes the following actions:

Action	Description
Get service status	Retrieves the current status of a Windows or application service. You can store the status of the selected service by assigning it to a selected variable. Example: The Windows Audio service status might be running. You can assign the status value to a selected variable.
Pause service	Pauses a Windows or application service that is currently running.
Resume service	Restarts a selected Windows or application service that was previously paused.
Start service	Starts a selected Windows or application service that is not running.
Stop service	Stops a selected Windows or application service that is currently running.

Simulate keystrokes package

Use the Simulate keystrokes package to simulate keystrokes in Chinese (simplified and traditional), English, French, German, Japanese, Korean, Italian, or Spanish characters.

Action in the Simulate keystrokes package

The Simulate keystrokes package includes the following action:

Action	Description
Keystrokes	See Using Keystrokes action on page 781.

Watch the following video on how to use Simulate keystrokes:

Related tasks

[Build a basic bot that uses a desktop application](#) on page 887

Build a bot that uses a conditional statement to verify that the calculator is open, then uses the calculator to multiply two numbers. This example uses actions from the Application, If, Simulate keystrokes, Message Box, and Window packages.

Using Keystrokes action

Use the Keystrokes action to simulate keystrokes.

Follow these steps to add a Keystrokes action:

1. In the Actions palette, double-click or drag the Keystrokes action from the Keystrokes package.
2. Specify the window in which to capture an object.

Choose from the Application, Browser, or Variable tab.

Option	Description
Application	Select from a list of currently active windows. This option shows a list of all the application and browser windows that are open on the Bot Creator device.
Browser	Select from a list of Google Chrome tabs that are currently open on the Bot Creator device.
Variable	Select an existing window variable to specify the title of the application window title.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as `((\w*) -Notepad` for all the window title names starting with `((\w*) -Notepad`, or use Pattern such as `((\w) \s) *document -Notepad` for only those window titles that match this pattern.

3. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.

- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

4. In the Keystrokes, select a radio button:
 - Enter keystrokes here or use the on-screen keyboard: Type or use the keyboard to enter keystrokes.
 - Select a credential: Uses a password stored in the Credential Vault.
5. Optional: In the Delay between each keystroke in ms field, the delay time.



Note: The default is set to 10 milliseconds.

6. Click Save.

SNMP package

The SNMP package allows you to automate network management tasks, such as retrieving and modifying data, and sending notification messages.

Simple Network Management Protocol (SNMP) is used to find the network management component on one or more computers and the managed component on multiple network devices.

The Automation Anywhere SNMP action offers powerful network management. Using this action, users can easily monitor network devices configured with SNMP agent software. Network devices such as servers, workstations, printers, routers, bridges, and hubs, as well as services such as Dynamic Host Configuration Protocol (DHCP) or Windows Internet Name Service (WINS) can be monitored.

Actions in the SNMP package

The SNMP package includes the following actions:

Action	Description
Get	See Using Get action on page 783
Get next	See Using Get next action on page 785
Send trap	See Using Send trap action on page 787
Set	See Using Set action on page 789
Walk	See Using Set action on page 789

Related reference

[Active Directory package](#) on page 523

Use the Active Directory package to automate actions in the Active Directory. An Active Directory is a directory service provided by Microsoft to assist the admin in managing users across a group or organization.

[Printer package](#) on page 743

Use the actions in the Printer package to automate retrieving and setting the default printer.

Using Get action

Use the Get action in the SNMP package to retrieve data of an object that is managed by an SNMP agent.

1. In the Actions palette, double-click or drag the Get action from the SNMP package.
2. In the Agent field, enter details of the device on which the SNMP agent is available.
3. In the SNMP Version section, select an option to specify the SNMP version to be used.

Option	Action
V1	Specify the community string you want to use in the Community field.
V2C	Specify the community string you want to use in the Community field.

Option	Action
V3	Specify the community string you want to use in the Community field. Select an option from the Authentication level list to specify the authentication level you want to use. • None: No authentication will be used. • Authentication Only: Enables you to use authentication only. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. • Authentication and privacy: Enables you to use authentication and privacy. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. c. Select DES or AES from the Privacy method list to specify the privacy method you want to use. d. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use.

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.
5. In the Data type section, select the ASCII or Hex option to specify the format in which you want to retrieve details of the object.
6. In the SNMP advanced option section, complete the following fields:
 - Timeout: Specify the time (in milliseconds) for the action to wait before generating an error.
 - Remote port: Specify the port number of the remote device.
 - Retries: Specify the maximum number of times the action must try to retrieve the details.
7. In the Result section, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room to store the result.
 - Desktop file: Uses a file that is available on a device to store the result.

- Variable: Uses a file variable to specify the file location that you want to use to store the result.
8. Select a string variable from the Assigned to list.
 9. Click Save.

Using Get next action

Use the Get next action in the SNMP package to retrieve data of the next object that is managed by an SNMP agent.

1. In the Actions palette, double-click or drag the Get next action from the SNMP package.
2. In the Agent field, enter details of the device on which the SNMP agent is available.
3. In the SNMP Version section, select an option to specify the SNMP version to be used.

Option	Action
V1	Specify the community string you want to use in the Community field.
V2C	Specify the community string you want to use in the Community field.

Option	Action
V3	Specify the community string you want to use in the Community field. Select an option from the Authentication level list to specify the authentication level you want to use. • None: No authentication will be used. • Authentication Only: Enables you to use authentication only. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. • Authentication and privacy: Enables you to use authentication and privacy. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. c. Select DES or AES from the Privacy method list to specify the privacy method you want to use. d. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use.

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.
5. In the Data type section, select the ASCII or Hex option to specify the format in which you want to retrieve details of the object.
6. In the SNMP advanced option section, complete the following fields:
 - Timeout: Specify the time (in milliseconds) for the action to wait before generating an error.
 - Remote port: Specify the port number of the remote device.
 - Retries: Specify the maximum number of times the action must try to retrieve the details.
7. In the Result section, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room to store the result.
 - Desktop file: Uses a file that is available on a device to store the result.

- Variable: Uses a file variable to specify the file location that you want to use to store the result.
8. Select a string variable from the Assigned to list.
 9. Click Save.

Using Send trap action

Use the Send trap action in the SNMP package to send messages to the SNMP manager from an SNMP agent. These messages are sent by an SNMP agent whenever certain events occur, such as a system restart.

1. In the Actions palette, double-click or drag the Send trap action from the SNMP package.
2. In the Agent field, enter details of the device on which the SNMP agent is available.
3. In the SNMP Version section, select an option to specify the SNMP version to be used.

Option	Action
V1	Specify the community string you want to use in the Community field.
V2C	Specify the community string you want to use in the Community field.

Option	Action
V3	Specify the community string you want to use in the Community field. Select an option from the Authentication level list to specify the authentication level you want to use. • None: No authentication will be used. • Authentication Only: Enables you to use authentication only. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. • Authentication and privacy: Enables you to use authentication and privacy. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. c. Select DES or AES from the Privacy method list to specify the privacy method you want to use. d. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use.

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.
5. Optional: In the Authorative ID field, specify the ID of the SNMP manager that will receive the notification.



Important: If you have selected V3 from the SNMP Version list, you must provide a value for Authorative ID.

6. Select an option from the Select trap type list to specify the type of trap you want to send.
 - Cold start: Occurs when the SNMP agent initializes its configuration tables.
 - Warm start: Occurs when the SNMP agent reinitializes its configuration tables.
 - Link down: Occurs when the state of a network adapter on the SNMP agent changes from up to down.

- Link up: Occurs when the state of a network adapter on the SNMP agent changes from down to up.
 - Authentication fail: Occurs when the SNMP agent receives a message from an SNMP manager with an invalid community name.
 - EGP neighbour loss: Occurs when the SNMP agent cannot communicate with its Exterior Gateway Protocol (EGP) peer.
 - Enterprise specific: Occurs when specific error conditions and error codes are defined in the system. The user provides a trap-specific number for this option.
7. In the SNMP advanced option section, complete the following fields:
 - Timeout: Specify the time (in milliseconds) for the action to wait before generating an error.
 - Remote port: Specify the port number of the remote device.
 - Retries: Specify the maximum number of times the action must try to retrieve the details.
 8. In the Result section, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room to store the result.
 - Desktop file: Uses a file that is available on a device to store the result.
 - Variable: Uses a file variable to specify the file location that you want to use to store the result.
 9. Click Save.

Using Set action

Use the Set action in the SNMP package to set a value for an object managed by the SNMP agent.

1. In the Actions palette, double-click or drag the Set action from the SNMP package.
2. In the Agent field, enter details of the device on which the SNMP agent is available.
3. In the SNMP Version section, select an option to specify the SNMP version to be used.

Option	Action
V1	Specify the community string you want to use in the Community field.
V2C	Specify the community string you want to use in the Community field.

Option	Action
V3	Specify the community string you want to use in the Community field. Select an option from the Authentication level list to specify the authentication level you want to use. • None: No authentication will be used. • Authentication Only: Enables you to use authentication only. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. • Authentication and privacy: Enables you to use authentication and privacy. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. c. Select DES or AES from the Privacy method list to specify the privacy method you want to use. d. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use.

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.

5. From the Value type list, select an option to specify the value you want to set.

- OctetString
- Integer
- Gauge
- TimeTicks
- IP
- ObjectID
- OctetByteString
- OctetDecimalByteString
- NULL

6. In the Set value field, specify the value you want to set.
7. In the SNMP advanced option section, complete the following fields:
 - Timeout: Specify the time (in milliseconds) for the action to wait before generating an error.
 - Remote port: Specify the port number of the remote device.
 - Retries: Specify the maximum number of times the action must try to retrieve the details.
8. In the Result section, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room to store the result.
 - Desktop file: Uses a file that is available on a device to store the result.
 - Variable: Uses a file variable to specify the file location that you want to use to store the result.
9. Click Save.

Using Walk action

Use the Walk action in the SNMP package to set up a collection of information about all the devices available on all the connected nodes or subtree.

1. In the Actions palette, double-click or drag the Walk action from the SNMP package.
2. In the Agent field, enter details of the device on which the SNMP agent is available.
3. In the SNMP Version section, select an option to specify the SNMP version to be used.

Option	Action
V1	Specify the community string you want to use in the Community field.
V2C	Specify the community string you want to use in the Community field.

Option	Action
V3	Specify the community string you want to use in the Community field. Select an option from the Authentication level list to specify the authentication level you want to use. • None: No authentication will be used. • Authentication Only: Enables you to use authentication only. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. • Authentication and privacy: Enables you to use authentication and privacy. a. Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use. b. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use. c. Select DES or AES from the Privacy method list to specify the privacy method you want to use. d. Select Credential to use a value from the Credential Vault, Variable to use a credential variable, or Insecure string to manually specify the value you want to use.

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.
5. In the Data type section, select the ASCII or Hex option to specify the format in which you want to retrieve details of the object.
6. In the Walk type section, select an option to specify the scope from which to collect information.
 - All: Displays the variables that are equal to the specified OID for the given tree type structure.
 - Within: All variables in the sub-tree below the given OID are queried.
7. In the SNMP advanced option section, complete the following fields:
 - Timeout: Specify the time (in milliseconds) for the action to wait before generating an error.
 - Remote port: Specify the port number of the remote device.
 - Retries: Specify the maximum number of times the action must try to retrieve the details.

8. In the Result section, select an option:
 - Control Room file: Uses a file that is available on the Enterprise Control Room to store the result.
 - Desktop file: Uses a file that is available on a device to store the result.
 - Variable: Uses a file variable to specify the file location that you want to use to store the result.
9. Select a string variable from the Assigned to list.
10. Click Save.

SOAP Web Service package

Use the SOAP web service action from the SOAP Web Service package to access and exchange information between two systems in XML format.

With SOAP Web Service, you can perform these actions:

- Consume SOAP web services written to provide structured data for further business processing, such as currency conversion, weather reports, and language translation.
- Connect to different existing applications and different platforms, irrespective of any underlying infrastructure requirements.

The SOAP Web Service establishes complete interoperability between clients or applications and the internet, supporting XML-based open standards, such as Web Services Description Language (WSDL), Simple Object Access Protocol (SOAP), and Universal Description Discovery and Integration (UDDI).

Passing values securely

You can securely pass values from the Credential Vault to the web service by specifying the locker, credential, and attribute in the following supported action fields:

- Custom headers
- Operation parameters
- Raw data: You must select a Credential Vault value that contains the entire parameter as the value.

Proxy support

If your device is configured with a proxy, all outbound requests from this package are routed through the proxy server. See [Connect Bot agent to a device with a proxy](#) on page 415.



Note: For an example task about using the SOAP Web Service action, see [Example of using the SOAP web service action](#) on page 903.

Related tasks

[Example of building a bot that uses credential variables](#) on page 881

Securely pass values to a bot using credential variables to automate the process of logging in to a bank website.

Related reference

[Credentials and credential variables in the Bot editor](#) on page 878

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

Step package

The Step package groups various actions together and runs them in a specific order. You can provide a relevant name for a step to identify the operation performed by the actions included in that step.

Action in the Step package

The Step package includes the following action:

Action	Description
Step	Runs a sequence of actions. • Creates a container for actions without impacting the bot run. • Configures actions within the Step action. • Runs the arranged actions in a sequential order. • Groups various actions for better management. • Optional: In the Title field, specify the title.

Watch the following video on how to use the Step actions:

String package

Use the String package to perform various operations such as comparing two strings, retrieving the string length, or converting a string to uppercase or lowercase.

Actions in the String package

The String package includes the following actions:

Action	Description
Assign	Assigns or concatenates strings. • Optional: In the Select the source string variable(s)/value field, specify the variable or values. This field hold up to 65535 alphanumeric, character, and empty values. • In the Select the destination string variable field, specify the variable.

Action	Description
Compare	Compares two strings. - In the Source string field, specify the source string. - In the Compare to string field, specify the source string. - In the When comparing field, select an option: - Match case: Matches capitalization. - Do not match case: Does not match capitalization. - In the Assign the output to variable list, specify the Boolean variable.
Extract text	See Using the Extract text action on page 797.
Find	See Using Find action on page 799.
Generate random string	Generates a string of uppercase and lowercase alphanumeric characters and assigns it to a string variable. - In the String length field, enter the number of characters in the generated string.  Note: The maximum number of characters is 300. - In the Enter the destination variable field, specify the string variable.
Length	Retrieves the string length. - In the Source string field, specify the source string. - In the Assign the output to variable list, specify the number variable.
Lowercase	Converts the source string to lowercase. - In the Source string field, specify the source string. - In the Assign the output to variable list, specify the variable.
Replace	See Using Replace action on page 799.
Reverse	Reverses the source string. - In the Source string field, specify the source string. - In the Assign the output to variable list, specify the variable.
Split	See Using Split action on page 800.
Substring	Extracts a substring from a string. - In the Source string field, specify the source string. - In the Start from field, specify the starting point. - Optional: In the Length field, specify the length. - In the Assign the output to variable list, specify the variable.
To boolean	Converts a string to a Boolean. - In the Source string field, specify the source string. - In the Assign the output to variable list, specify the Boolean variable.

Action	Description
To number	Converts a string to a number. This action supports positive, negative, and decimal numbers.  Note: If the string contains commas, remove them by using the Replace action to replace each comma with an empty string. • In the Source string field, specify the source string. • In the Assign the output to variable list, specify the number variable.
Trim	Trims blanks and whitespaces from a string. • In the Source string field, specify the source string. • In Trim from the beginning and Trim from the end, select options. • In the Assign the output to variable list, specify the variable.
Uppercase	Converts the source string to uppercase. • In the Source string field, specify the source string. • In the Assign the output to variable list, specify the variable.

Watch the following video on how to use the String actions:

Related tasks

[Using the Extract text action](#) on page 797

Use the Extract text action to extract a range of text using logical operators from the source string.

[Using Find action](#) on page 799

Use the Find action to find a substring within the specified string.

[Using Replace action](#) on page 799

Use the Replace action to find a piece of text from the source string and replace it with another text.

[Using Split action](#) on page 800

Use the Split action to split the specified string into multiple strings and store the output in a list variable.

Extract text

The Extract text action enables you to extract text from a source string. You can extract text before, after, or between two strings.

Using the After Option

This option enables you to extract the entire text followed by the value you have provided in the Start after text field. You can also extract the text based on the occurrence of the value you have provided in the field.

For example, `a:123a:123b:123c:` is the source string, you can specify ':' in the Start after text field and '2' in the Occurrence field to extract the string followed by the second occurrence of ':' in the source string. In this example, the extracted text is '123b:123c:'.

Using the Before Option

This option enables you to extract the entire text preceding the value you have provided in the End before text field. You can also extract the text based on the occurrence of the value you have provided in the field.

For example, `a:123a:123b:123c:` is the source string, you can specify ':' in the End before text field and '3' in the Occurrence field to extract the string preceding the second occurrence of ':' in the source string. In this example, the extracted text is 'a:123a:123b'.

Using the Before and/or after option

This option enables you to extract the text between the values you have provided in the Start after text and the End before text fields. You can also apply the AND or OR logical operator. You can select the AND operator to extract text only when both conditions specified for the Before and After options are satisfied. Otherwise, you can select the OR operator to extract text only when either of the conditions specified for the Before or the After option is satisfied.

For example, `a:123a:123b:123c:` is the source string, you can specify ':' in the Start after text and End before text fields and '2' in the Occurrence fields to extract the string after the second and before the fourth occurrence of ':' in the source string. In this example, the extracted text is '123b:123c'.

Using the Extract text action

Use the Extract text action to extract a range of text using logical operators from the source string.

To extract a substring from the specified source string, do the following:

1. In the Actions palette, double-click or drag the Extract text action from the String package.
2. In the Source string field, specify the source string.
3. Specify the text to extract by selecting from the following options:

Option	Steps
Before	Extracts the entire text followed by the value that you have provided in the Start after text field. a. In the Start after text field, enter a string to use as the starting point. b. In the Occurrence field, enter a value to specify the number of occurrences. For example, if the source string is <code>This is a test string which is used to extract specific sub-string</code> and you want to extract the entire text after <code>This</code>. To extract the required text, you must enter <code>This</code> in the Start after text field and 1 in the Occurrence field. This indicates to the system to extract the text that is available after the first occurrence of <code>This</code> in the source string.

Option	Steps
Before and/or after	Extracts the text between the values provided in the Start after text and the End before text fields. - In the Start after text field, enter a string to use as the starting point. - In the OR or AND field, select one of the options: - OR: Select to extract text if either of the values specified in the Start after text or the End before text field are available in the source string. - AND: Select to extract text if both the values specified in the Start after text and the End before text fields are available in the source string. - In the End before text field, specify a string to use as the endpoint for extracting the text. - In the Occurrence field, enter a value to specify the number of occurrences of the string you have provided in the End before text field. For example, if the source string is <code>This is a test string which is used to extract specific substring</code> and you want to extract the entire text before <code>specific</code>. To extract the required text, you must enter <code>specific</code> in the End before text field and 1 in the Occurrence field. This indicates to the system to extract the text available before the first occurrence of <code>specific</code> in the source string.
After	Extracts the entire text preceding the value you have provided in the End before text field. - In the End before text field, specify a string to use as the endpoint for extracting the text. - In the Occurrence field, enter a value to specify the number of occurrences of the string you have provided in the End before text field. For example, if the source string is <code>This is a test string which is used to extract specific substring</code> and you want to extract the entire text before <code>specific</code>. To extract the required text, you must enter <code>specific</code> in the End before text field and 1 in the Occurrence field. This indicates to the system to extract the text available before the first occurrence of <code>specific</code> in the source string.

- In the If no match found, return field, select one of the options:
 - Source String: Return the source string.
 - Empty (null) String: Return the null string if no match is found.
- In the Number of characters to get field, select one of the options:
 - All: Extracts all characters from the source string.
 - Only: Specify the number of characters to extract from the source string.

6. In the Trim the extracted text (remove blank spaces) check box, select to remove blank spaces from the extracted text.
7. In the Remove Enter from the extracted text check box, select to remove carriage returns from the extracted text.
8. In the Assign the output to variable list, specify the variable.
9. Click Save.

Using Find action

Use the Find action to find a substring within the specified string.

This action also enables you to perform a search based on a regular expression. A regular expression is a sequence of characters that define a search pattern. For example, to find all email addresses in the source string, specify the following as a regular expression: `\b[A-Z0-9._%]+@[A-Z0-9.-]+\.[A-Z]{2,4}\b`.



Note: To search for strings that contain the dollar sign (\$), you must enter the sign twice. Otherwise, the bot interprets the dollar sign as a regular expression character.

To find a substring from the specified string, follow these steps:

1. In the Actions palette, double-click or drag the Find action from the String package.
2. In the Source string field, specify the source string.
3. In the Find string field, specify the substring.
4. In the When finding field, select one of the options:
 - Match case: Matches the case of the text.
 - Do not match case: Does not match the case of the text.
5. In the The "find string" is field, select one of the options:
 - A regular expression: The substring is a regular expression
 - Not a regular expression: The substring is not a regular expression.
6. Optional: In the Start from field, specify the starting point.
For example, you want to replace Red in the source string with Blue in a paragraph. Red is in 10 instances in the paragraph and you want to replace only the third occurrence. Enter 3 in the Start from field to identify the third occurrence.
7. In the Assign the output to variable list, specify the number variable.
8. Click Save.

Using Replace action

Use the Replace action to find a piece of text from the source string and replace it with another text.

A regular expression is a sequence of characters that define a search pattern. For example, to find all email addresses in the source string, specify the following as a regular expression: `\b[A-Z0-9._%]+@[A-Z0-9.-]+\.[A-Z]{2,4}\b`.

To replace text from the specified string, follow these steps:

1. In the Actions palette, double-click or drag the Replace action from the String package.
2. In the Source string field, specify the source string.
3. In the Find string field, specify the substring.
4. In the When finding field, select one of the options:
 - Match case: Matches the case of the text.

- Do not match case: Does not match the case of the text.
5. In the The "find string" is field, select one of the options:
 - A regular expression: The substring is a regular expression
 - Not a regular expression: The substring is not a regular expression.
 6. Optional: In the Start from field, specify the starting position.
This field deletes the preceding characters. For example, for the source string "Big blue ocean", if you specify 5 in the Start from field, when the bot runs, the action removes the four preceding characters "Big " and searches for the substring in "blue ocean".
 7. Optional: In the Count field, specify the number of times the found string must be replaced.
For example, in the source string "Big blue ocean, blue fish, blue sky", you want to replace the first two instances of "blue" with "green". Enter 2 in the Start from field, 5 in the Start from field, and green in the Replace with field. When the bot runs, the action produces the output green ocean, green fish, blue sky.
 8. In the Replace with field, specify the text to replace the string.
 9. In the Assign the output to variable list, specify the variable that will hold the new string.
 10. Click Save.

Using Split action

Use the Split action to split the specified string into multiple strings and store the output in a list variable.

To split a string into multiple strings, perform these steps:

1. In the Actions palette, double-click or drag the Split action from the String package.
2. In the Source string field, specify the source string.
3. In the Delimiter field, specify the character to split the string.
For example, comma (,), semicolon (;), pipe (|), slash (/ \), newline character (\n), or space.

In the delimiter text box, the newline character is not accepted for the Enter key as a line break. In that case, you can either press F2 and select Enter - String from String section or input the `$String:Enter$` variable.
4. In the Delimiter is field, select one of the options:
 - Case sensitive: The delimiter is case-sensitive.
 - Not case sensitive: The delimiter is not case-sensitive.
5. In the Split into substrings field, select one of the options:
 - All possible: Splits the source string into as many substrings as possible.
For example, if the original string is a,b,c,d, each character becomes a substring.
 - Only: Limits the number of substrings.
For example, if the original string is a,b,c,d, and you enter 3, the output is three strings: a, b, and c,d.
6. In the Assign the output to variable list, specify the list variable.
7. Click Save.

System package

Use the actions in the System package to automate locking, logging off, restarting, and shutting down the computer. Use these actions at the end of a task.

The System package includes the following actions:

Action	Description
Get environment variable	See Environment variables for System package on page 801
Lock computer	Locks the computer.
Logoff	Logs the user off the computer.
Restart	Restarts the computer.
Shutdown	Shuts down the computer.

Related tasks

[Using Log To File action](#) on page 686

Using the Log To File action, you can create a log file with data about the events that occur when a TaskBot runs.

Related reference

[Application package](#) on page 536

Use the Open Program/File action in the Application package to launch an application or a file. This action supports .exe, .bat, script files, or shortcut paths.

Environment variables for System package

Select from the list of variables in the Get environment variable action to return the system parameters of the device on which a bot is running.

Variable	Description	Example value
ALLUSERSPROFILE	Returns the path to the directory that contains resources and settings used by all system accounts.  <u>Note: Use ProgramData for devices that run Windows Vista and later OS.</u>	C:\ProgramData
APPDATA	Returns the file path to the application data directory. This directory contains the settings for applications shared across multiple devices.	C:\Users\<user>\AppData\Roaming
COMPUTERNAME	Returns the device name without the domain.	AA-NY-FRANKSINATRA
CommonProgramFiles	Returns the file path to the Common Files directory.	C:\Program Files\Common Files
CommonProgramFiles(x86)	Returns the file path to the Common Files directory.  <u>Note: This is only available for devices that run 64-bit version.</u>	C:\Program Files(x86)\Common Files

Variable	Description	Example value
CommonProgramW6432	Returns the file path to the Common Files directory.  Note: • This is only available for devices that run 64-bit version. • Only use CommonProgramW6432 for devices that run Windows Vista and later OS	C:\Program Files \Common Files
ComSpec	Returns the file path to the command processor	C:\Windows \system32\cmd.exe
DriverData	Returns the file path to the Driver Data directory.	C:\Windows \System32\Drivers \DriverData
HOMEDRIVE	Returns the home drive of the device.	C:
HOMEPATH	Returns the homepath of the device without the system drive.	\Users\<user>
LOCALAPPDATA	Returns the file path to the application data directory. This directory contains the settings for applications shared across multiple devices.	C:\Users\<user> \AppData\Local
LOGONSERVER	Returns the name of the group or domain to which the device is connected	\\SJCSRVBKP
NUMBER_OF_PROCESSORS	Returns the number of processors in the device.	4
OneDrive	Returns the path to the OneDrive folder.	C:\Users\<user> \OneDrive
OS	Returns the device operating system name.	Windows_NT
Path	Returns a semicolon-delimited list of directories that contain executable programs.	C:\Windows \system32;C: \Windows;C: \Windows \System32\Wbem;C: \Windows \System32\WindowsPowerShell \v1.0\
PATHEXT	Returns a semicolon-delimited list of file extensions that the system can execute.	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.C
PROCESSOR_ARCHITECTURE	Returns the process architecture of the device.	AMD64

Variable	Description	Example value
ProgramData	Returns the path to the directory that contains resources and settings used by all system accounts.  Note: Use ALLUSERSPROFILE for devices that run the Windows XP and earlier OS.	C:\ProgramData
ProgramFiles	Returns the path to the directory that stores installed programs.	C:\Program Files
ProgramFiles(x86)	Returns the path to the directory that stores installed programs.  Note: This is only available for devices that run 64-bit version.	C:\Program Files (x86)
ProgramW6432	Returns the path to the directory that stores installed programs.	C:\Program Files
PSModulePath	Returns file paths to the modules that are installed on the disk.	%ProgramFiles%\WindowsPowerShell\Modules;C:\Windows\system32\WindowsPowerShell\v1.0\Modules
PUBLIC	Returns the Public folder path.	C:\Users\Public
SystemDrive	Returns the device system drive.	C:
SystemRoot	Returns the system root folder.	C:\Windows
TMP	Returns the path to the directory that stores temporary files.	C:\Users\<user>\AppData\Local\Temp
TEMP	Returns the path to the directory that stores temporary files.	C:\Users\<user>\AppData\Local\Temp
USERDNSDOMAIN	Returns the DNS domain of the user.	AAI.AASPL-BRD.COM
USERDOMAIN	Returns the domain of the user.	AAI.AASPL-BRD.COM
USERDOMAIN_ROAMINGPROFILE	Returns the domain of the user profile.	AAI
USERNAME	Returns the logged-in user name.	bob.ross
USERPROFILE	Returns the user profile path.	C:\Users\<user>
windir	Returns the Windows directory path.	C:\Windows

Task Bot package

Use the Run, Pause, and Stop actions in the Task Bot package to manage running one or more child bots from a parent bot or with a third-party software using an API.

Build smaller bots that automate a single task and run them from a parent bot. For example, build a `Login` child bot to enter the username and password into a web form and click submit. The `Login` child bot accepts credentials from the parent bot and returns a success message, and then the parent bot can call the subsequent `CreateInvoice` child bot. The `Login` child bot should also contain error handling logic in case the credentials are incorrect.

This practice of building smaller, self-contained bots enables a user to reuse the bot logic in a greater number of tasks, and makes error handling and troubleshooting easier. This also decreases the amount of time spent building and maintaining bots. As a result, an organization is able to rapidly scale their automation initiatives. The `Login` child bot from this example can be reused in any task that involves providing credentials to a login page on a website.



Note: CSV/text file and Recorder sessions cannot be shared across bots. You can share Excel sessions across bots by using a session variable. See [Example of sharing an Excel session between bots](#) on page 806.

In addition, running child bots from a parent bot offers greater control over data in the following ways:

- Users can configure the variables to control the direction in which information can be exchanged by selecting from the following options:
 - Use as input: The variable holds a value that can be passed from a parent bot or third-party software to a child bot.
 - Use as output: The variable holds a value that can be passed from a child bot to the parent bot or third-party software.
 - Both: The value can be passed in both directions.
 - Neither: The variable is confined to this bot; it cannot be shared across other bots.

See [Create a variable](#) on page 873

- Other users can reuse child bots without viewing their contents.

The Task Bot package includes the following actions:

Action	Description
Pause	Temporarily pauses the running bot. Use the Pause action to modify data or to verify the status of a relevant component. When the bot reaches the Pause action during run time, a Resume button appears. You must click Resume for the bot to continue to the next action.

Action	Description
Run	Runs the selected task multiple times for a specified number of times or for a number of hours. The task can be repeated until the user chooses to stop it. You can save the output values to a dictionary variable, where each key in the dictionary is the variable name and corresponding value from the child bot. Or, you can map each dictionary key to a variable to store the corresponding value. The Control Room file tab provides option to either choose a file available in the Enterprise Control Room or specify a string variable in the Control Room path field to specify the bot you want to run. This enables you to use an expression to specify the bot you want to run and select the bot to run dynamically. See Using the Run action on page 805. For an example, see Example of using the Run action on page 900.
Stop	Stops the running bot. For example, use the Stop action to terminate the bot if a condition is met, such as if the bot encounters a file larger than 100 MB.

Using the Run action

The Run action from the TaskBot package enables you to run one or more child bots. Configure the action to run the child bots repeatedly or with a delay, and to pass and retrieve values.

1. In the Actions palette, double-click or drag the Run action from the Task Bot package.
2. In the Task Bot to run field, select the child bot:

Option	Description
Current Task Bot	
Control Room file	Click Browse and select a bot from your private workspace. The system shows suggestions from the bots available in the private repository when you start typing the name of the bot you want to run. The location of the selected bot in the private repository is also displayed.
Variable	Insert a file variable that contains an .atmx file.

3. In the Input values fields, enter the values or variables to pass to the child bot:
 - a) Select an input variable to activate the text field.
 - b) Enter a value of the required data type.

The icon on the left-side of the text field indicates the data type.

If you are configuring a bot with many input variables, use the Quick map option to automatically map variables that share the same name and data type. If the child bot contains variables for which there are no corresponding variables in the parent bot, the Quick map option creates new variables and maps them.

4. Optional: Select the repetition.
5. Optional: Select the Delay between repetitions option and enter the delay time in the Minutes and Seconds fields.

6. Optional: Select the Upon error, start next repetition option.
For alternative error-handling options, use actions from the Error handler package.

[Error handler package](#) on page 600

7. In the Save outcome to a variable field, select either the Multiple variables or Dictionary option:

Option	Description
Multiple variables	Click Add variable mapping to associate each dictionary key with a variable in the parent bot. This option eliminates the need to use actions to extract the dictionary values.
Dictionary	Insert or create a dictionary variable to hold the output variables and values in key-value pairs. Each key in the dictionary is the variable name and corresponding value from the child bot.

8. Click Save.

For an example of using this action:

- [Example of using the Run action](#) on page 900
- [Example of sharing an Excel session between bots](#) on page 806

Example of sharing an Excel session between bots

Build two bots to update the employee salaries in a worksheet. In this example, one bot opens an Excel worksheet and passes the session name as a variable to the second bot, which iterates through the worksheet, calculates each employee's new salary, and updates the value in the worksheet.

Create a worksheet with the following data:

Employee ID	Start date	Salary
200	1/12/2020	50000
233	3/15/2018	75000
500	6/6/2020	60000
555	7/9/2019	65000

Build the child to iterate through the table of employees and update each salary to reflect the raise.

1. Open a new bot.
 - a) From Automation Anywhere web interface, select Bots > My bots.
 - b) Click Create a bot.
 - c) Enter the bot name `RaiseSalaries`.
 - d) Enter the folder location `\Bots\TaskBotExample`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Create the following variables:

- `sessionVariable`: session type; MS Excel subtype; use as input
 - `sCellAddress`: string type; default value of C2
 - `sSalary`: string type
 - `nSalary`: number type
3. Use a Loop action to iterate through all the rows in the worksheet.
 - a) Double-click or drag the Loop action.
 - b) Select the For each row in worksheet iterator.
 - c) Select the Shared session tab and insert `$sessionVariable$`.
 - d) Select the Read cell value option.
 - e) In the Assign the current value to this variable field, create a record variable.
 4. Retrieve the employee's salary.
 - a) Drag into the Loop container the Excel Advanced > Get single cell action.
 - b) Select the Shared session tab and insert `$sessionVariable$`.
 - c) Select the Specific cell option and insert `$sCellAddress$`.
 - d) Select the Read cell value option.
 - e) In the Store cell contents to field, insert `$sSalary$`.
 5. Convert the salary value to a number data type.
 - a) Drag into the Loop container the String > To number action.
 - b) In the Enter the string field, insert `$sSalary$`.
 - c) In the Assign the output to variable field, insert `$nSalary$`.
 6. Calculate the new salary to be five percent greater than the current salary.
 - a) Drag into the Loop container the Number > Assign action.
 - b) In the Select source variable field, enter `$nSalary$*1.05`.
 - c) In the Select destination variable field, insert `$nSalary$`.
 7. Update the salary in the worksheet.
 - a) Drag into the Loop container the Excel Advanced > Set cell action.
 - b) Select the Shared session tab and insert `$sessionVariable$`.
 - c) Select the Specific cell option and insert `$sCellAddress$`.
 - d) In the Cell value field enter `$nSalary.Number.toString$`.



Note: You must convert the value to a string data type before the bot can enter it into the worksheet. Use type casting as an alternative to the Number > To string action. [Type casting](#) on page 874

8. Move the cursor down by a single cell and assign that cell address to `sCellAddress`.
 - a) Drag into the Loop container the Excel Advanced > Go to cell action.
 - b) Select the Shared session tab and insert `$sessionVariable$`.
 - c) Select the Active cell and One cell below options.
 - d) Drag into the Loop container the Excel Advanced > Get cell address action.

- e) Select the Shared session tab and insert `$sessionVariable$`.
 - f) Select the Active cell option.
 - g) In the Save active cell address field, insert `$sCellAddress$`.
 9. Click Save and Close.
- Build the parent bot.
10. Open a new bot.
 - a) Click Create a bot.
 - b) Enter the bot name `ExcelParentBot`.
 - c) Enter the folder location `\Bots\TaskBotExample`.
To change where your bot is stored, click Choose and follow the prompts.
 - d) Click Create and Edit.
 11. Create the following variable:
`sessionVariable`: session type; MS Excel subtype
 12. Open the Excel worksheet.
 - a) Double-click or drag the Excel Advanced > Open action.
 - b) In the Session name field, enter `Session1`.
 - c) In the File path field, enter the file path to the worksheet you created above.
 - d) Select the Sheet contains header option.
 13. Assign the session to a variable.
 - a) Double-click or drag the Excel Advanced > Set session variable action.
 - b) In the Session name field, enter `Session1`.
 - c) In the Save session to a variable field, select `$sessionVariable$`.
 14. Select the child bot you built in the above.
 - a) Double-click or drag the Task Bot > Run action.
 - b) Click the Control Room file option and click Browse to select the `RaiseSalaries` bot.
 - c) In the Input values section, select the Set SessionVariable option and insert `$sessionVariable$`.
 15. Click Save and Run.
The Excel worksheet opens and the value of each cell in the third column increases by five percent.

Terminal Emulator package

The Terminal Emulator package contains actions that enable you to connect to and automate tasks on another machine. Use these actions to access and control operations on a remote machine. For example, you can run applications and access files on a different operating system.

The Terminal Emulator enables a machine to connect to and communicate with another machine using a command-line or graphical interface. The Terminal Emulator uses the Telnet or SSH protocol to communicate with other machines.

The Terminal Emulator supports ANSI, TN3270E, TN5250E, and VT100 terminal types.

Before you start

Perform the following actions within the Terminal Emulator package as part of using the set of available actions:

1. Establish a connection with a host machine using the Connect action.

You must first establish a connection with a host machine to automate any Terminal Emulator related task. When establishing the connection, specify the details of the host machine and associate it with a session name. Use the session name provided in this action in the other actions so that you do not have to provide details of the host machine in those actions again. See [Using the Connect action](#) on page 811.



Important: If you use any other action from this package before establishing the connection, you will encounter an error.

2. Use the Terminal Emulator actions to automate a task. For example, use the Get field action to retrieve the value from a particular field.
3. After you have automated all the Terminal Emulator related tasks, terminate the connection to the host machine using the Disconnect action.

Actions in the Terminal Emulator package

The Terminal Emulator package includes the following actions:

Action	Description
Clear terminal	Clears the screen of the terminal. Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.
Connect	See Using the Connect action on page 811.
Disconnect	Terminates the connection with the terminal. Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.
Get all fields	Retrieves the values of all fields and assigns them to a table variable. • Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action. • Select a table variable to store the retrieved data from the Assign the value to an existing table variable list. The table stores each field as a row, with the values of each field organized in the following columns: • Field index • Field name • Field value • Is Editable (yes/no) • Is Hidden (yes/no)  Note: You can use this action with the TN3270E and TN5250E terminal types.

Action	Description
Get field	Retrieves the value of a field based on the index or name of the field and assigns it to a string variable. - Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action. - Select the By index option to retrieve the value of a field based on its index, or select the By name option to retrieve the value of a field based on its name. - Select a string variable to store the retrieved data from the Assign the value to an existing variable list.  Note: You can use this action with the TN3270E and TN5250E terminal types.
Get text	See Using Get text action on page 815.
Hide terminal	Hides the terminal screen. This action enables you to hide the terminal screen when the Show terminal window option from the Connect action is selected. It is useful when you do not want to display the terminal screen when a bot is performing certain tasks. Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.
Search field	Searches for the field based on the text it contains. - From the Terminal emulator session name field, choose one of the following options: - Local name to establish a connection with the terminal using the Connect action - Shared session to share the variable from Set session variable or from the parent bot - Specify the text based on which you want to search the field. - Select an option from Select field to specify whether to retrieve the index or name of the field. - Assign and save the output to a variable.  Note: The search text you enter must be a complete match and is not case-sensitive.
Send key	See Using Send key action on page 815.
Send text	See Using Send text action on page 816.

Action	Description
Set cursor position	Sets the position of the cursor on the screen of the terminal. - Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action. - Specify the row number in which to set the cursor in the Set row field. - Specify the column number in which to set the cursor in the Set column field.  Note: You can enter a value of 1 through 999 to specify the row and column number where the cursor is set.
Set field	See Using Set field action on page 817.
Set session variable	Assign the session name to a variable. Pass this session variable from the parent bot to a child bot by entering the variable as an input type variable in the child bot.
Show terminal	Shows the terminal screen. This action enables you to show the terminal screen when the Show terminal window option from the Connect action is not selected. It is useful when you want to display the terminal screen when a bot is performing certain tasks. You must specify Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.
Wait	See Using Wait action on page 817.

Using the Connect action

Use the Connect action to establish a connection with a host machine on which you want to automate a task. You can use this action to establish a connection with the TN3270E, TN5250E, ANSI, VT220, and VT100 terminal types.

This action enables you to specify the details of the host machine and associate it with a session name. Use the session name provided in this action in the other actions, so that you do not have to provide details of the host machine in those actions again.



Important: If you use any other action from this package before establishing the connection, you will encounter an error.

To establish a connection with a host machine, perform the following steps:

1. Double-click or drag the Connect action from the Terminal Emulator node in the Actions palette.
2. Specify a name for the session in the Terminal emulator session name field.
3. Specify the Host name of the machine you want to connect to:
 - a) Click the Credential tab to select an entry from the Credential Vault.
 - b) Click the Variable tab to use a variable to specify the host name.
4. Enter a value in the Port field to specify the port you want to use to connect to the host.
5. Select one of the following options to specify the terminal type:

Option	Steps
ANSI	Select an option from the Connection type list to specify the type of connection you want to establish: • Telnet • SSH2 For SSH2 connection type: • For User authentication: • User name: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually. • For Password: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually. • For Key file authentication: Click one of the following options to specify the location of the file: • Control Room file: Enables you to select a PDF file that is available in a folder. • Desktop profile: Enables you to select a PDF file that is available on your device. • Variable: Enables you to specify the file variable that contains the location of the PDF file. • For User name: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually.
TN3270E	- Select an option from the Host name security list to specify the security you want to use: • NONE • SSL • TLS - Select the Enable TN3270E support check box if you want to choose a connection method. Select an option from the Connection method list: • GENERIC: Enables you to specify the Device name. • SPECIFIC: Enables you to specify the Device name and Resource (LU) Name. - Select an option from the Terminal model list to specify the terminal workstation you want to connect to. - Select an option from the Code page list to specify the encoding you want to use for the terminal.

Option	Steps
TN5250E	- Select an option from the Host name security list to specify the security you want to use: - NONE - SSL - TLS - Select the Enable TN5250E support check box if you want to specify details about the device and resource. Enter a value in the Device name and Resource (LU) Name fields. - Select an option from the Terminal model list to specify the terminal workstation you want to connect to. - Select an option from the Code page list to specify the encoding you want to use for the terminal.

Option	Steps
VT Series	
• VT100	a. Select an option from the Terminal model list to specify the terminal type you want to connect to.
• VT220	b. Select an option from the Encoding list to specify the encoding you want to use for the terminal: • ANSI • DBCS • UTF-8 The CodePage field appears when DBCS option is selected. The CodePage supports only Japanese Shift-JIS (932).
	c. Select an option from the Connection type list to specify the type of connection you want to establish: • Telnet • SSH2 For SSH2 connection type: • For User authentication: • User name: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually. • For Password: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually. • For Key file authentication: Click one of the following options to specify the location of the file: • Control Room file: Enables you to select a PDF file that is available in a folder. • Desktop profile: Enables you to select a PDF file that is available on your device. • Variable: Enables you to specify the file variable that contains the location of the PDF file. • For User name: Click the Credential tab to select an entry from the Credential Vault. You can also click the String tab to enter a value manually.

6. Select the Show terminal window check box to show the terminal window when the bot runs this action.
7. Select the Wait for the terminal prompt to appear while connected check box to wait for the terminal prompt to appear on the screen of the terminal after the connection is established.
 - a) Enter the text you want to display when you connect to the terminal in the Terminal prompt field.
 - b) Enter a value in the Wait time out field to specify the period in (milliseconds) the system must wait before the connection request is timed out.
8. In the Assign value to variable list, select a string variable.

Using Get text action

Use the Get text action to retrieve text from the terminal and store it in a string variable. This action enables you to retrieve text from the last line, all lines, or a range of lines. You can use this action with the TN3270E, TN5250E, ANSI, and VT100 terminal types.

To retrieve text from the terminal, do the following:

1. Double-click or drag the Get text action from the Terminal Emulator node in the Actions palette.
2. Enter the name of the session that you have used to establish a connection with the terminal using the Connect action in the Terminal emulator session name field.
3. Select an option from the Get text list to specify the lines from which you want to retrieve text:
 - Last line: Retrieves text from the last line of the terminal.
 - All lines: Retrieves text from all lines of the terminal.
 - Lines from-to: Retrieves text from the specified range of lines of the terminal. You must enter values in the Start row and End row fields to specify the range.



Note: You can specify a value of 1 through 999.

4. Select a string variable from the Assign the value to an existing variable list to assign the retrieved text to that variable.
5. In the Assign value to variable list, select a string variable.

Using Send key action

Use the Send key action to send a key to the terminal. You can use these keys to perform various operations on the terminal. You can use this action with the TN3270E, TN5250E, ANSI, and VT100 terminal types.

To send a key to the terminal, do the following:

1. Double-click or drag the Send key action from the Terminal Emulator node in the Actions palette.
2. Enter the name of the session that you have used to establish a connection with the terminal using the Connect action in the Terminal emulator session name field.
3. Select an option from the Select key to be send list to specify the key you want to send.
4. Enter a value in the Delay after send key command field to specify the period the system must wait (in milliseconds) after the selected key is sent.
5. Select the Wait for text or prompt to appear check box if you want the system to wait for the prompt or certain text to appear on the terminal.
 - a) Select the Prompt option if you want the system to wait till the prompt appears on the terminal.
 - b) Select the Text option if you want the system to wait till the specific text appears on the terminal.
You must provide the text you want to appear on the terminal in the Text value to be appear on screen field.
 - c) Select the Wait before send key for prompt or text appear check box if you want the system to wait for the prompt or the specified text to appear on the terminal before sending the selected key.
 - d) Select the Wait after send key for prompt or text appear check box if you want the system to wait for the prompt or the specified text to appear on the terminal after sending the selected key.

- e) Enter a value in the Time out for prompt or text to appear field to specify the period (in seconds) the system must wait before the operation times out.
6. In the Assign value to variable list, select a string variable.

Using Send text action

Use the Send text action to send text to the terminal. This action also enables you to send predefined keys after the text to perform various operations in the terminal. You can use this action with the TN3270E, TN5250E, ANSI, and VT100 terminal types.

To send a text to the terminal, do the following:

1. Double-click or drag the Send text action from the Terminal Emulator node in the Actions palette.
2. Enter the name of the session that you have used to establish a connection with the terminal using the Connect action in the Terminal emulator session name field.
3. Specify the Text you want to send to the terminal:
 - a) Click the Credential tab to select an entry from the Credential Vault.
 - b) Click the Variable tab to use a variable that contains the text you want to send.
4. Select the Send a key after sending the above text check box if you want to send a key after sending the text.
 - a) Select the key you want to send from the list.
 - b) Enter a value in the Delay after send key command field to specify the period (in milliseconds) the system must wait after sending the selected key.
5. Select the Wait for text or prompt to appear check box if you want the system to wait for the prompt or certain text to appear on the terminal.
 - a) Select the Prompt option if you want the system to wait till the prompt appears on the terminal.
 - b) Select the Text option if you want the system to wait till the specific text appears on the terminal.
You must provide the text you want to appear on the terminal in the Text value to be appear on screen field.
 - c) Select the Wait before send key for prompt or text appear check box if you want the system to wait for the prompt or the specified text to appear on the terminal before sending the selected key.
 - d) Select the Wait after send key for prompt or text appear check box if you want the system to wait for the prompt or the specified text to appear on the terminal after sending the selected key.
 - e) Enter a value in the Time out for prompt or text to appear field to specify the period (in seconds) the system must wait before the operation times out.
6. In the Assign value to variable list, select a string variable.

Using Set field action

Use the Set field action to set a value in a particular field in the terminal. This action also enables you to send predefined keys after the value to perform various operations in the terminal. You can use this action with the TN3270E, TN5250E, ANSI, and VT100 terminal types.

To set a value for a field in the terminal, do the following:

1. Double-click or drag the Set field action from the Terminal Emulator node in the Actions palette.
2. Enter the name of the session that you have used to establish a connection with the terminal using the Connect action in the Terminal emulator session name field.
3. Specify the field for which you want to set a value:
 - a) Select the By index option to specify the field based on its index.
The index value starts from zero and ends at 99999. For example, if you want to set the value for the third field, you must specify 2 in this field.
 - b) Select the By name option to specify the location of the field.
For example, if you want to set the value for a field in the fifth column of the third row, you must specify R3C5 in the field.
4. Specify the Plain text value you want to set in the specified field:
 - a) Click the Credential tab to select an entry from the Credential Vault.
 - b) Click the Variable tab to use a variable that contains the text you want to send.
5. Select the Send enter key after setting field check box if you want to send the enter key after setting the field.
This option performs the operation similar to pressing the Enter key after setting the value in the field.
6. Select the Send a key after sending the above text check box if you want to send a key after sending the text.
 - a) Select the key you want to send from the list.
 - b) Enter a value in the Delay after send key command field to specify the period (in milliseconds) the system must wait after sending the selected key.
7. In the Assign value to variable list, select a string variable.

Using Wait action

Use the Wait action to introduce a delay till specific conditions are met in the terminal. You can use this action to wait before executing the next action till the specific text appears on the screen, the cursor moves to the specified location, and so on. You can use this action with the TN3270E, TN5250E, ANSI, and VT100 terminal types.

To wait till specific conditions are met in the terminal, do the following:

1. Double-click or drag the Wait action from the Terminal Emulator node in the Actions palette.
2. Enter the name of the session that you have used to establish a connection with the terminal using the Connect action in the Terminal emulator session name field.
3. Select an option from the Terminal event list to specify a condition the system should wait till it is met.
The following table provides information about the options available in the list and the input required for each option:

Option	Input required
Wait till text appears	Waits till the text you have specified in the Text field appears on the screen of the terminal.
Wait till text disappears	Waits till the text you have specified in the Text field disappears from the screen of the terminal.
Wait till cursor moves to position	Waits till the cursor moves to the position you have specified in the Move to row and Move to column fields.  Note: You can enter a value of 1 through 999 to specify the row and column number where the cursor is set.
Wait till cursor moves out of position	Waits till the cursor moves out of the position you have specified in the Move out of row and Move out of column fields.  Note: You can enter a value of 1 through 999 to specify the row and column number where the cursor is set.
Wait till screen gets blank	No input required.
Wait till screen contains text	Waits till the text you have specified in the Text field is available on the screen of the terminal.
Wait till terminal prompt appears	No input required.
Wait till terminal ready state	No input required.

4. Enter a value in the How long you would like to wait? field to specify the period (in milliseconds) the system must wait before the operation times out.
5. In the Assign value to variable list, select a string variable.

Share session between TaskBot logic

Use the Shared Session option in the Terminal Emulator package to pass the exact state of an application to the concurrently occurring TaskBot logic.

Shared session enables you to reuse actions between TaskBots that run concurrently, for example, connecting to the same application.

To use shared session, create a hierarchy of TaskBot logic that are connected by the Shared Session option. As a result, large TaskBot logic are trimmed by removing repetitive commands for connecting and disconnecting.

1. Create a parent bot such as TE_Share_Main that connects to an application on the Terminal Emulator.
2. Use the Set session variable action in the TE_Share_Main to assign the current session to a variable such as \$te_session\$ of Terminal Emulator session type.
3. Create a child bot such as TE_BMIS to perform any actions such as Get text and Set field.
4. Add a Run Task action in the TE_Share_Main to call the TE_BMIS.
5. To pass a session variable from the TE_Share_Main to TE_BMIS, select \$te_session\$ as an input value in the Set SessionVariable.

6. In the TE_BMIS , use Shared session tab and insert \$te_session\$ as a session variable to obtain data or perform task.
7. In the main task, add an action to disconnect from the application.

Trigger loop package

The Trigger loop package enables you to run a series of actions when a trigger event occurs. You can insert multiple trigger loops within a bot or nest one trigger loop within another trigger loop.

Actions in the Trigger loop package

Action	Description
Trigger loop	Opens the loop.  Note: Events within the Trigger loop follow a sequential order and any parallel events that occur during this time are queued.
Handle	Specifies the trigger event and runs the actions that are inside of the container when that event occurs. Drag this action to the right of the Trigger loop action (Flow view) or below the Trigger loop action (List view).
Break	Terminates the loop so that the bot continues with the actions below the loop. Drag this action inside of the Trigger Handle container.  Note: You must close the loop with a Break action or else the bot will run indefinitely.

Triggers in the Handle action

Trigger	Description	Options
Form	Runs the actions when a form field is modified. Select an existing form and element. Using interactive forms on page 931	- On click: Button is clicked. - Got focus: Input field is clicked. - Lost focus: User leaves the input field. - Changed value: Check box or radio button status is changed. - Value selected: Check box is selected. - Value unselected: Check box is deselected. - Assigned to (optional): Creates or selects a variable, and assigns the value from the specified form element to this variable.

Trigger	Description	Options
Hot key	Runs the actions when specific keys are pressed.	- Modifiers: Ctrl, Shift, Alt, AltGr, and Win - Keys: - Letters A-Z - Numbers 0-9
Object	Runs the actions when an event occurs on the selected interface element. For example, when a user clicks a button. Interface triggers for objects are available only for native Windows applications.	

V11 Task Bot package

The V11 Task Bot package enables you to run a 11.x bot from Enterprise A2019 in the 11.x Enterprise Control Room.

Actions in the V11 Task Bot package

The package includes the following action:

Action	Description
Run	See Using Run action on page 820.

Using Run action

Use the Run action to run a 11.x bot from Enterprise A2019 in the 11.x Enterprise Control Room.

Ensure that the 11.x user credential that you want to use to run the 11.x bot includes the following:

- Access to the 11.x Bot Runner device on which you want to run the 11.x bots
- Run my bots and View my scheduled bots permissions

To use the Send callback status to A2019 option, ensure the following:

- The IP address of the Enterprise A2019 Bot Runner device on which you want to run the A2019 bot is a static IP address
- The IP address is available in the callback URL of the 11.x Enterprise Control Room

[Callback URLs for bot deployment](#)

1. Double-click or drag the Run action from the V11 Task Bot node in the Actions palette.
2. Provide the 11.x Enterprise Control Room URL in which you want to run the bot.
3. Click the Credential tab to use a value from the Credential Vault and the Variable to use a credential variable.

Alternatively, click the Insecure string tab to manually specify the value you want to use as the Username and Password to log in the Enterprise Control Room you have specified.

4. Specify the location of the bot you want to run in the Task relative path field.
5. Optional: Specify the device on which you want to run the bot in the Bot Runner device name field.
You can specify multiple devices separated by a semicolon. Ensure that the names of the devices you have provided are the same as those on the My Devices page of the 11.x Enterprise Control Room.

If you do not provide any value in the field, the system runs the bot on any connected devices (device for which the user specified in the Step 3).

6. Select the Run bot runner session on Control Room check box to deploy the bot using the remote desktop process.
7. Select the Wait for task to complete check box if you want the system to wait for the task to complete before performing the next action in the bot.
 - a) Specify the period you want the system to wait before the bot is timed out in the Total wait time field.
 - b) Select the version of the Enterprise Control Room on which you want to run the bot.

- 11.3.2 or later (includes 11.3.3.x releases):

Click Advanced settings to expand and update the polling attributes.

Field	Description
Wait time before start polling the status	Period (in seconds) you want the system to wait before it starts polling the status after the bot is deployed on the device.
Polling interval for non-started execution	Time interval at which you want the system to poll for status for the 11.x bot you have set to run but has not started execution.
Polling interval for pending execution	Time interval at which you want the system to poll for status for the bot that you have set to run and is pending execution.
Polling interval for paused execution	Time interval at which you want the system to poll for status for the bot that has started execution and is paused.
Polling interval for in-progress execution	Time interval at which you want the system to poll for status for the bot that has started execution and is currently in progress.
Polling interval for unknown execution	Time interval at which you want the system to poll for status for the bot that has started execution and the current status is unknown.

- 11.3.4 or later:
 - Select the Send callback status to A2019 option to specify a range for the TCP port that you want to use to send the callback status to Enterprise A2019.

Field	Description
From available TCP port	Starting value in the range for the TCP port that you want to use to send the callback status.
To available TCP port	End value in the range for the TCP port that you want to use to send the callback status.



Note: The IP address of the Enterprise A2019 Bot Runner must be reachable from 11.x Enterprise Control Room on the range for the TCP port you have provided.

- Select the Poll status from 11.x Control Room option. Click Advanced settings to update the polling status from the 11.x Enterprise Control Room:

Field	Description
Wait time before start polling the status	Period (in seconds) you want the system to wait before it starts polling the status after the bot is deployed on the device.
Polling interval for non-started execution	Time interval at which you want the system to poll for status for the 11.x bot you have set to run but has not started execution.
Polling interval for pending execution	Time interval at which you want the system to poll for status for the bot that you have set to run and is pending execution.
Polling interval for paused execution	Time interval at which you want the system to poll for status for the bot that has started execution and is paused.
Polling interval for in-progress execution	Time interval at which you want the system to poll for status for the bot that has started execution and is currently in progress.
Polling interval for unknown execution	Time interval at which you want the system to poll for status for the bot that has started execution and the current status is unknown.

- Select the dictionary variable from the Input parameters list that you want to use to pass input parameters for the bot.

The input variables that you want to pass for the bot are contained as keys in the dictionary variable with their corresponding values.

- Select the dictionary variable that you want to use to store the output from the Assign the output to list.

The dictionary variable stores the output parameters of the 11.x bot as keys.

Additionally, the following keys are added in the dictionary variable by default:

Key	Value
COMMAND	Name of the command that was last executed by the 11.x bot.
STATUS	Status of the 11.x bot execution.
START_TIME	Time when execution of the 11.x bot started.
END_TIME	Time when execution of the 11.x bot ended.
AUTOMATION_NAME	Name of the automation

10. Click Save.

VBScript package

The VBScript package contains actions that enable VBScript functions in a task.

Before you start

1. Verify that the device on which you want to run the VBScript has Windows operating system installed.
2. Open a VBScript file, or input the script you want to run using the Open action. You must associate the details of the file or script you want to run with a session name. Use this same session name for other VBScript actions.
3. Use the Run function action to execute a function within the script or execute the entire script. You must use the VBScript session name you established in the previous step.
4. After you have executed the script, close the VBScript session.

To review the bot launcher logs, navigate to `C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip`. Each zipped folder contains a file with data on the code execution, which is useful for debugging.

Actions in the VBScript package

The VBScript package includes the following actions:



Note: The Open action must be the first action to use the VBScript in a task.

Action	Description
Close	Closes the session. Specify the same session name from the Open action.

Action	Description
Run function	Runs a function within the VBScript. - In the VBScript session field, specify a session name. Use the same session name from the Open action. - Optional: Specify the function name to run and the arguments to pass to the function.  Note: You can pass only a list variable as an argument for the function. You can use the list variable to pass multiple arguments of different data types such as Boolean, datetime, number, and string. - Optional: If the specified function returns a value, specify the variable to store that value in the Assign the output to variable field.  Note: In VBScript, stand alone scripts do not return a value.
Open	Opens a VBScript file. - In the VBScript session field, specify a session name. Use this same session name for other VBScript actions. - In the VBScript, choose one of the following options: - In the Import existing file option, select an existing VBScript file.  Note: If you are uploading a script from a file on your desktop, the file and any dependencies must be in a standalone folder. When you select a file for upload, all files and folders at the same folder level are uploaded. - In the Manual input option, enter the VBScript.

Resources

To learn more, see [Training - Write inline scripts in a bot](#). This course introduces you to write inline scripts within a command.



Note: You must log in with a registered A-People Community [account](#) to access course.

Wait package

Use the actions in the Wait package to add a condition to wait for an application screen to change, or a separate window to open or close before proceeding to the next action.

Actions in the Wait package

The Wait package includes the following actions:

Action	Description
Wait for condition	Makes the bot wait until a specific condition is true before executing the next action. In the Wait till field, specify the condition to meet. For example, the wait condition can be based on whether an application is running, a folder or file exists, a variable matches the specified value, an application window exists, or a machine or server is running. This action offers the same conditions as the If package. See the If package on page 656.
Wait for screen change	See Using Wait for screen change action on page 825.
Wait for window	See Using Wait for window action on page 826.

Using Wait for screen change action

Use the Wait for screen change action to wait for the content of a specific screen or the entire window to change before executing the next action.

For example, a Human Resources (HR) personnel automating leave-management tasks wants to log in to the HR portal. After entering the user credentials, this action enables the automation task to wait until the next screen loads.

1. In the Actions palette, double-click or drag the Wait for screen change action from the Wait package.
2. In the Screen change relative to field, choose Window or Screen.
3. Select an application window:

Option	Steps
Application	From the drop-down list, select the window title from the open applications. - The Window title field displays the title of the application window you have selected. You can use the wildcard character in this field to enable the action to identify an application window with a similar title. Example: Enter Balance Sheet* to identify all open windows having title starting with Balance Sheet in the window title. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as (\w*) -Notepad for all the window title names starting with (\w*) -Notepad, or use Pattern such as (\w) \s) *document - Notepad for only those window titles that match this pattern. - The Executable field displays the complete path of the executable file to identify the right window.
Variable	Use a window variable to specify the application window you want to use.

- Enter values (in pixels) in the Left, Top, Width, and Height fields to specify the dimensions of the screen.
The measurement starts from the top-left corner of the screen. Move vertically downward to indicate the height and horizontally from left to right to indicate the width.
- In the How long to wait before comparing screens? field, specify the wait time (in seconds) to begin comparing the window or screen.
When a difference is detected, the comparison stops and the task proceeds to the next action.
- In the How long to wait before screen comparing is stopped? field, specify the wait time (in seconds) for the screen to change.
If the screen does not change within the time you specified, the task proceeds with the next action.
- Select the Throw an exception if the screen is not changed option to show an error message and terminate the bot if the screen does not change.
If the option is deselected and the screen does not change, the task proceeds with the next action.
- Click Save.

Using Wait for window action

Use the Wait for window action to wait for the specified window to open or close before executing the next action.

For example, a Human Resources (HR) personnel automating leave-management tasks might require the attendance application to open before they enter the user credentials. This action enables the automation task to wait until the application window opens.

1. In the Actions palette, double-click or drag the Wait for window action from the Wait package.
2. In the Wait for window field, select the option you want the automation to wait for:
 - Wait for window to open
 - Wait for window to close

3. Select an application window:

Option	Steps
Application	From the drop-down list, select the window title from the open applications. • The Window title field displays the title of the application window you have selected. You can use wildcard character in this field to enable the action to identify an application window with a similar title. Example: Enter Balance Sheet* to identify all open windows with a title that starts with Balance Sheet. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*)-Notepad</code> for all the window title names starting with <code>(\w*)-Notepad</code>, or use Pattern such as <code>(\w)\s)*document-Notepad</code> for only those window titles that match this pattern. • The Executable field displays the complete path of the executable file to identify the right window.
Variable	Use a window variable to specify the application window you want to use.

4. In the How long you would like to wait for this condition to be true? field, specify the wait time (in seconds) for the window to open or close.
If the window does not open or close within the time you specify, the task proceeds to execute the next set of actions.
5. Select the Throw an exception if wait for window is unsuccessful option to show an error message and terminate the bot if the window does not open or close within the specified amount of time.
If the option is deselected and the window does not open or close within the specified amount of time, the task proceeds with the next action.
6. Click Save.

Window package

Use the Window package to automate tasks relating to the window.

Window is a data type available for storing application window titles. It is the only data type that can be used in all the actions of the Window package. Create a variable of data type Window and select or assign a window title. Use this variable in any number of actions within the automation task. If the application window title changes, then change the value assigned to the variable. The new application title is reflected in all the actions where the variable is used.

Actions in the Window package

The Window package includes the following actions:

Action	Description
Activate	Activates a window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - In the Window title field, specify the title. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>((\w*)-Notepad</code> for all the window title names starting with <code>((\w*)-Notepad</code>, or use Pattern such as <code>((\w)\s)*document-Notepad</code> for only those window titles that match this pattern.
Assign	Assigns a source window variable's value to a designated window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - In the Select the destination window variable/value field, specify the variable.  Note: The regular expression (regex) is currently not supported.

Action	Description
Close	Closes the application window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*) -Notepad</code> for all the window title names starting with <code>(\w*) -Notepad</code>, or use Pattern such as <code>(\w)\s)*document-Notepad</code> for only those window titles that match this pattern.  Note: When multiple Excel windows are opened, the bot closes all the open Microsoft Excel windows even when a specific Excel window name is selected to close.
Get active window title	Retrieves the title of the active window. In the Assign the window title to variable field, specify the variable.  Note: The regular expression (regex) is currently not supported.
Maximize	Maximizes a window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*) -Notepad</code> for all the window title names starting with <code>(\w*) -Notepad</code>, or use Pattern such as <code>(\w)\s)*document-Notepad</code> for only those window titles that match this pattern.

Action	Description
Minimize	Minimizes a window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*) -Notepad</code> for all the window title names starting with <code>(\w*) -Notepad</code>, or use Pattern such as <code>(\w) \s) *document -Notepad</code> for only those window titles that match this pattern.
Resize	Resizes a window. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive. For example, you can enter the String value as <code>(\w*) -Notepad</code> for all the window title names starting with <code>(\w*) -Notepad</code>, or use Pattern such as <code>(\w) \s) *document -Notepad</code> for only those window titles that match this pattern. - In the Left, Top, Width, and Height fields, specify values for resizing the window.

Action	Description
Set title	Assigns a new window title to a window variable. - In the Window field, select an option: Choose from the Application, Browser, or Variable tab. - Application: Select from a list of windows, including browser windows, that are currently open on the Bot Creator device. - Browser: Select from a list of Google Chrome tabs. - Variable: Select an existing window variable to specify the title of the application window title. - In the New window title field, enter the new title.  Note: The regular expression (regex) is currently not supported.

Workload package

The Workload package enables you to insert work items in a queue for workload automation. It also enables data chaining between multiple queues. You can orchestrate multiple bots, and enable optimal device utilization through the queueing mechanism of workload management.

For example, a business process of Employee Salary Processing:

- A payroll queue can process the employee salaries, and a payroll bot can add work items to a finance queue.
- The finance queue in turn can release the funds to employees and a finance bot in turn adds work items in a HR queue to email employees on the salary processing completion.

You must have the Queue Owner or Participant privileges to view the list of queues in the Workload package.

Actions in the Workload package

The Workload package includes the following action:



Note: If you built a bot using actions from the Workload package from Build 5322 or earlier, the action will be missing when you open the bot with the default package version. You must reinsert the action and repopulate the fields.

Action	Description
Insert work item	Allows you to insert a work item from an existing queue to another queue as part of a bot execution.

Related concepts

[Workload management](#) on page 1079

The workload management module enables users to upload Microsoft Excel and CSV files to the Enterprise Control Room so that it feeds the records from the files into the bot deployments.

Related tasks

[Attach work item template to TaskBot](#) on page 861

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

[Use Work Item variables](#) on page 877

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

Using Insert work item action

The Insert work item action provides you the flexibility to insert a work item to another queue as part of a bot execution.

You must have the Queue Owner or Participant privileges to view the list of queues in the Workload package.

Use the Insert work item to manage complex workflows by configuring a bot to add work items from multiple queues. For example, use a bot to read a list of invoices from a .csv file and add the invoices due for payment to another bot that manages information of payments due on specific dates. The automation can be used in the scenarios where work items are part of a different system (Database, Excel) and the bot reads them and adds them to a queue or where one queue adds work items to another queue as part of data chaining.

1. In the My bots page, Create a bot or Edit an existing bot.
2. In the Actions palette, double-click or drag the Insert Work Item action from the Workload package.
3. In the Workload: Insert work item window, add parameters such as the Queue and work item values:
 - a) Click Browse to select a queue name from the list of queues to insert as a work item.
 - b) Click Confirm to add the queue.
 - c) Start entering work item values in the work item fields.



Note: These parameters are populated based on the work item template associated with the selected queue.

You can also assign a variable value to these parameters by pressing the F2 key and selecting a variable name from the list.



Tip: Use UTC format (YYYY-mm-dd 00:00:00) for Date data type.

4. Click Save.
The action is added to the bot.
5. Add more data using the Insert Work Item action.
After the required data is added, Save the bot and Check in the bot to the Public folder for further processing and deployment.

Related concepts

[Create workload queues](#) on page 1080

A queue is one of the main building blocks of Workload Management (WLM). A queue holds data known as Work Items for further processing. The system distributes these Work Items to individual Unattended Bot Runners in a device pool for processing.

Related tasks

[Attach work item template to TaskBot](#) on page 861

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

[Use Work Item variables](#) on page 877

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

[Insert Work Items](#) on page 1084

Add Work Items from an Excel or CSV file to the queue after you define the structure.

XML package

Extensible Markup Language (XML) is a markup language designed to store and transport data. Use the actions in the XML package to automate the processing of XML data generated from web services and cloud computing applications.

An XML document is structured as an ordered and labeled tree. Each node of the tree is an XML element and is written with an opening and closing tag. In the following example, custname and custid are nodes:

```
<customer>
<custname>XYZ Corp</custname>
<custid>A001</custid>
</customer>
```

XPath is a query language that uses path expressions to select nodes or node-sets in an XML document. XPath includes built-in functions for manipulation of string, numeric, Boolean, date and time, and so on.

Before you start

Perform the following actions within the XMLpackage.

1. Start the XML session using the Start XML Session action. Use this session name for all corresponding actions.
2. Use the different actions available in the XML package to automate XML-related tasks.
3. Save the session using the Save XML Session action to assign the data to a file or String-type variable.
4. End the session using the End XML Session action to complete a task.

Actions in the XML package

The XML includes the following actions:

Action	Description
Delete node	Deletes a specific node from XML file. • Enter the session name or select an existing window variable used in the Start XML session action. • Enter the XPath expression for the node to be deleted or select an existing window variable. • Enter the attribute (optional)
End session	Closes an XML session. • Enter the session name or select an existing window variable used in the Start XML session. • Save and close the session.

Action	Description
Execute XPath function	Executes an XPath function and stores the results in a variable. - Enter the session name or select an existing window variable used in the Start XML session action. - Enter the XPath expression or select an existing window variable. - Assign a String-type variable to the output.
Get multiple nodes	Retrieves the value of multiple nodes. - Enter the session name or select an existing window variable used in the Start XML session action. - Enter the XPath expression to retrieve multiple nodes or select an existing window variable. - In the Get each node field, select if you require the Text value, XPath expression, or Specific attribute name of each node.
Get single node	Retrieves the value of a single node. - Enter the session name or select an existing window variable used in the Start XML session action. - Enter the XPath expression, and attribute (optional) to retrieve a node. - Assign the output to a String-type variable.
Insert node	See Using Insert node action on page 835.
Save session data	Saves the XML session data to a file or variable of type String. - Enter the session name or select an existing window variable used in the Start XML session action. - To save the session data to a file, select the Write XML data option and specify a file path. - Select Overwrite to replace the existing file if a file with the same name exists in the location you have specified. - Assign the output to a String-type variable.
Start session	Creates a new XML session based on an XML file or specified text. - Start the XML session. - Enter the session name or select an existing window variable. Use this session name for all corresponding actions. - In the Data Source field, select either File or Text: - File: Select from the Control Room file, Desktop file, or an existing Variable of File type. - Text: Specify the text name or select an existing window variable. - Save the XML session.

Action	Description
Update node	Updates the value of a node. - Type the session name or select an existing window variable used in the Start XML session action. - Enter the XPath expression for the node to be updated. - Enter a New value for the node. - Select the Updates attribute(s) option to create a new Dictionary or to add an existing Variable of Dictionary-type.
Validate XML document	The tags and document structure are defined when the XML document is created. Use this action to validate an XML document. - Enter the session name or select an existing window variable used in the Start XML session. - Select the validation type from the following options: - XML schema files (.xsd) - Specify the schema using a List or Variable. Create a new variable of type List or use one that already exists. - Internal Document Type Definitions (DTDs) - Well formed - Assign the output to a variable using Assign the output (Valid or Invalid) to variable

Using Insert node action

Use this action to insert a node in an existing XML file and assign it to a value. Optionally, assign a name space and attributes to the node.

To insert a node, do the following:

- Enter the session name.
Use the name of the session that you have used in the Start XML session action.
- Specify an XPath expression to indicate where to insert the new node.
- Enter a node name.
- Enter a value for the node.
- If the node name exists, select from the following options:
 - Insert it anyways
 - Skip it
 - Overwrite it
- Specify the location to insert the node from the following options:
 - Beginning of the child nodes
 - End of the child nodes
 - Before specific child note
 - After specific child node

If Before Specific child node or After Specific child node is selected, specify the child node name before or after which the node must be inserted.

- Optional: Enter the default name space to be mapped to the node.

8. Enter the attributes using a Dictionary-type variable.
Create a new variable of type Dictionary or use one that already exists.
9. Optional: Enter the attribute name space using a Dictionary-type variable
Create a new Dictionary-type variable or use one that already exists.
10. Click Save.

Get started with recorders

You can use two recorders in Enterprise A2019, the Universal Recorder and the AISense Recorder, to automate tasks by recording interactions with objects such as click, read (data extraction), and write (data entry).

An integrated Recorder

In versions 2.0.9-20201105-164103 and later, the Recorder package contains both the Universal Recorder and AISense Recorder. This offers the following benefits:

- Feature updates are delivered as delta updates, which reduces the time spent downloading the newest Recorder package each release.
- The Start recording icon serves as a common entry point to both recorders.



Note: The AISense Recorder fails if you manually upgrade the Recorder package version, such as by importing a bot that contains the integrated Recorder package (Version A2019.17 and later) to a Enterprise Control Room that has a build from Version A2019.16 or earlier. Always upgrade the Recorder package through the Enterprise Control Room. Do not attempt to manually upgrade by importing a .jar file or bot.

Choosing which recorder to use for your task

Before you start building your bot, decide which recorder best fits your requirements.

- Use the Universal Recorder to automate interactions with user interface objects in a browser, HTML, Java, Microsoft, Oracle, SAP, or Windows application. When you run the bot, if it cannot reliably find objects, use the AISense Recorder.
- Always use the AISense Recorder in the following scenarios:
 - You are accessing the software using Citrix, or a similar remote desktop technology.
 - You are automating in a legacy technology, such as Delphi.

Universal Recorder for object-based automation

Use the Universal Recorder to record interactions, such as click, read (data extraction), and write (data entry) with user interface (UI) objects on the desktop, taskbar, or in an application or browser window.

The earlier Automation Anywhere RPA products such as Version 11.3 have three separate recorders to capture objects from various environments. Enterprise A2019 combines the capabilities of these three recorders into the Universal Recorder to streamline the recording process.

Using the Universal Recorder

You can use the Universal Recorder in the following ways:

1. To record a process consisting of multiple steps, use the Universal Recorder video camera icon, which is located on the top-left of the workbench.

See [Record a task with the Universal Recorder](#) on page 838.

2. To record a single interaction that you want to add into an existing TaskBot (for example, if you missed a step when recording a task), use Capture action from the Recorder package.

See [Using the Capture action](#) on page 758.

For a common use case, see [Example of entering data into a web form from a worksheet](#) on page 890.

The Universal Recorder is also used within actions to capture coordinates (Mouse > Click action) or a local file path (Application > Open program/file action).

Background processing

Background processing enables an automation to run in the background. Use it in recorded tasks that use Citrix Virtual Apps and Windows native applications. Some packages, such as the Excel basic and Excel advanced inherently support background processing. The following actions support background processing:

- Click
- Set Text
- Get Text

Related tasks

[Record a task with the Universal Recorder](#) on page 838

Use the Universal Recorder to capture a series of interactions (clicks, keystrokes, and mouse movements) with object controls including text boxes, buttons, tables, menus, radio buttons, combo boxes, check boxes, list views, links, trees, and page tabs.

[Edit a task recorded with the Universal Recorder](#) on page 839

After recording a task, edit the Capture actions to change the window, capture a different object, select a new action, enable background processing, enter a different wait time, or save the output to a variable.

Related reference

[Supported browsers for Enterprise A2019](#) on page 307

The user interface for Enterprise A2019 (On-Premises or Cloud deployed) and for Community Edition is accessible through a browser.

[Secure recording mode](#) on page 846

When secure recording mode is enabled, the bots do not capture values of certain properties or store application images. This ensures that sensitive data is not stored in the bots. This setting only applies to bots that are created or edited after the mode is enabled.

[Recording tasks in applications that run on JRE 6](#) on page 846

Use the Universal Recorder to capture objects from Java applet, web start, and desktop applications that run using Java Runtime Environment (JRE) 6.

[Recorder package](#) on page 749

Use the Capture action from the Recorder package to capture an interaction with a user interface (UI) object such as a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, and page tab. The Capture action replaces the Object Cloning command from Version 11.3.

[Actions performed on objects captured with Universal Recorder](#) on page 750

After capturing the object, specify the action for the bot to do to the object at run time. For example, when you capture a hyperlink, you can select to click the link or to retrieve the link text. Refer to the table below for the objects and their possible actions.

Record a task with the Universal Recorder

Use the Universal Recorder to capture a series of interactions (clicks, keystrokes, and mouse movements) with object controls including text boxes, buttons, tables, menus, radio buttons, combo boxes, check boxes, list views, links, trees, and page tabs.

- To use the Recorder, you must already have done the following:
 - [Install Bot agent and register device](#) on page 400
 - [Set user device credentials](#) on page 415
- Configure device display and font scale to 100%.

If you are using Recorder package version 2.0.6-20200626-193519 or later, you can record tasks in Google Chrome, Internet Explorer, Java, Microsoft Active Accessibility, and Microsoft UI automation applications on a computer that has display scale configured to 100%, 125%, or 150%.

- If you are automating a task using a browser, configure the zoom level to 100%.

If you are using Recorder package version 2.0.6-20200626-193519 or later, you can record tasks in a Google Chrome browser that does not have a zoom level setting of 100%.

- If you are automating a task using a Google Chrome browser, ensure that the Automation Anywhere plug-in that corresponds with the Enterprise A2019 build version is enabled.

[Supported browsers for Enterprise A2019](#) on page 307

Considerations when recording a task:

- Use clicks when possible rather than shortcut keys.
- If you are automating a task using a browser, do not use autofill to enter values into fields.
- Record the task at low speed.
- Avoid dragging windows during the recording process.
- Avoid clicking on applications that are not part of the process you are recording and automating.
- When Internet Explorer is used, the action waits until the browser is completely rendered and is in a ready state before executing the action.

To record a task using the Universal Recorder, follow these steps:

1. From Automation Anywhere web interface, select BOTS > My bots.
2. Create a new bot or open an existing bot for which you want to record a task.
3. Click Start recording.



Note: In versions 2.0.9-20201105-164103 and later, the Recorder package contains both the Universal Recorder and AISense Recorder.

[An integrated Recorder](#) on page 836

The Automation Anywhere Recorder window appears.

4. Select a window from the drop-down list.
If you opened an application recently and it is not available in the list, click the Refresh icon.
5. Click Universal Recorder.

6. Perform the steps in the task. For example, click buttons, fill in forms, or search a website.
To perform an action on an object, move the mouse pointer on that object. The object is highlighted with a box. If the box does not appear, verify that you have enabled the necessary plug-in. For more information, see [Universal Recorder supported applications and browsers](#) on page 841.
The Recorder window contains the number of operations recorded and a description of the most recently captured object. For example, 5. Left click on button 'Submit'.
To redo the previous object capture, click the Delete icon at the bottom right of the Recorder window to discard the most recent capture.
If Secure recording mode is enabled, a shield icon appears to the right of the red recording icon.
[Secure recording mode](#) on page 846
7. Click Finish after you finish capturing all the necessary objects.
A Capture action is generated for each operation.
Where applicable, the Recorder generates variables. [User-defined variables](#) on page 869
8. Edit the actions or click Save.
[Edit a task recorded with the Universal Recorder](#) on page 839

Edit a task recorded with the Universal Recorder

After recording a task, edit the Capture actions to change the window, capture a different object, select a new action, enable background processing, enter a different wait time, or save the output to a variable.

Select the List view to see the full details of each action.

Edit a recorded task to do the following:

- Change the application window in which you want to perform the operation, or add a wildcard to the window title.
- Change the properties of the captured objects.
- Specify the action you want to perform on the captured objects.
- Introduce a delay before the next action is performed.
- Specify the variable you want to use to store the output.

To add a Capture action to the task, see [Using the Capture action](#) on page 758.

To edit a recorded task, follow these steps:

1. Open the bot that contains the recorded actions you want to edit.
2. Click the Capture action that you want to edit.

Make the following changes, as necessary:

3. Change the window selection to the Currently active window option.
4. Optional: Insert a wildcard character (*) in the window title that is subject to change, such as for online invoices.

For example, Sample* - Google Chrome.

You can use a regular expression (regex) to identify a window title. Select the regular expression either as a String or Pattern for each regular expression condition and enter the value. By default, the Window title field is case-sensitive. You can enable Case insensitive regex flag to identify a window title that is not case-sensitive.

For example, you can enter the String value as ((\w*) -Notepad for all the window title names starting with ((\w*) -Notepad, or use Pattern such as ((\w*) \s) *document-Notepad for only those window titles that match this pattern.



Note: During runtime, verify that the TaskBot identifies the correct window. If it does not, do the following:

- a. Open the application or browser window.
- b. Drag a Window > Get active window title action above the Recorder > Capture action.
- c. Insert a string variable into the Assign the window title to variable field.
- d. Drag a Window > Set title action below the Window > Get active window title action.
- e. In the Window field, insert the window variable generated by the Recorder > Capture action.
- f. In the New window title field, insert the string variable from the Get active window title action.
- g. Click Save.

5. Optional: Select the Resize window option to specify the window dimensions.

This option delivers a more reliable bot. It resizes the window to the dimensions at which the task was recorded, which enhances the bot's ability to identify the target object.

- If the window is maximized when you record the task, this option is unselected.
- If the window is not at the maximum size when you record the task, this option is selected by default and the width and height fields auto-fill with the window dimensions.



Note: This option is only available for windows that can be resized. It is not available for the Desktop or Taskbar options.

6. Review the Object properties table.

The bot uses the selected properties to identify the object control at runtime.

- a) Verify that the Control Type matches your intended object.

For example, when capturing a table from a website, ensure the Control Type and HTML Tag values are TABLE.

If the Control Type does not match your intended object, recapture the object control.

- b) Select and assign values to the object properties that you want to include in the object search.

For a more reliable bot, we recommend that you select only the properties that have static values (such as Name, Class, Type, HTML ID, and DOMXPath), and deselect the properties that have dynamic values (such as HTML Href, Path or Value), which are subject to change and cause bot errors.

You can use the wild card character (*) and variables in object property values to re-use the same action to capture different objects in different scenarios.

7. Select the Action from the drop-down list.

For a full list of possible actions by object, see [Actions performed on objects captured with Universal Recorder](#) on page 750.

- If you record a click and keystrokes in a text box with a Control Type of `PASSWORD_TEXT`, the Recorder does not capture the keystrokes entered into the field. Instead, the action selects the Set text option and offers options to securely input the password. We recommend that you store the password in the Credential Vault and insert it into the action as a credential. [Credentials and credential variables in the Bot editor](#) on page 878

If you navigate to the text box using the TAB keystroke instead of a click in an MSAA or SAP application, the Recorder is able to identify fields with a Control Type of `PASSWORD_TEXT`.

- If the selected Action supports background processing, a Run in the background option appears. [Background processing](#) on page 837
8. Optional: Enter a value in the Wait for control field to specify the number of milliseconds the bot must wait for the object control to appear on the application window.
We recommend setting a delay time when using the Set text action to enter keystrokes into a text field.
 9. Optional: Assign the output to a variable.
 10. Perform the Steps 3 through 9 for the other actions that you want to edit in the bot.
 11. Click Save.

[Run the bot.](#)

Universal Recorder supported applications and browsers

Use the Universal Recorder to record interactions with objects from the supported technologies.

Applications

- HTML applications
- Java applet, web start, and desktop applications that run using Java Runtime Environment (JRE) 6, 7, 8, 9, 10, and 11 (32-bit and 64-bit versions)
See [Recording tasks in applications that run on JRE 6](#) on page 846.
- Microsoft Active Accessibility and UI automation
- Microsoft Silverlight version 5 (standard Microsoft controls only)
- Oracle EBS and Forms
- SAP versions 730, 740, 750 patch 9, and 760 patch 5
- Citrix Virtual Apps

Browsers

- Google Chrome (versions 57 and later)
To run a bot that contains actions from the Recorder package, you must enable the Google Chrome extension that corresponds with the Recorder package version. See [Google Chrome browser extension requirements](#) on page 308.
If you encounter an error when recording or running a bot that automates tasks in a Google Chrome browser and you have installed the Google Chrome, you must perform additional steps to configure your system. See [Google Chrome extension troubleshooting](#) on page 842.
- Internet Explorer (version 11)
- Microsoft Edge based on Chromium (versions 79 and later)
Microsoft Edge is supported on Recorder package version 2.0.9-20201105-164103 and later. You must install the A2019 plug-in for Microsoft Edge and verify that it is running

in the Task Manager: [Automation Anywhere A2019 - Microsoft Edge Plug-in](#)



Note: Ensure that the Google Chrome extension is not installed in the Microsoft Edge browser because that configuration causes recording and runtime errors. [Google Chrome extension installed in Microsoft Edge](#) on page 845

- Mozilla Firefox

Mozilla Firefox is supported on Recorder package version 2.0.11-20210128-034104 and later. You must install the A2019 extension for Mozilla Firefox: [Enterprise A2019 extension for Mozilla Firefox](#)

Desktop

The desktop refers to the device screen when all application and browser windows are minimized.

Taskbar

The taskbar is the horizontal or vertical bar containing icons of open applications and browsers, as well as the notification area. You can capture application, browser, and system icons, such as Clock and Calendar, volume, and Wi-Fi.

UI objects

See [Actions performed on objects captured with Universal Recorder](#) on page 750.

Watch the following video for a demo on using the Universal Recorder in various applications:

Related reference

[Actions performed on objects captured with Universal Recorder](#) on page 750

After capturing the object, specify the action for the bot to do to the object at run time. For example, when you capture a hyperlink, you can select to click the link or to retrieve the link text. Refer to the table below for the objects and their possible actions.

Google Chrome extension troubleshooting

If you encounter an error when recording or running a bot that automates tasks in a Google Chrome browser and you have installed the Google Chrome, you must perform additional steps to configure your system.

Prerequisites

Ensure the Automation Anywhere Google Chrome extension you are using corresponds with the Recorder package version in your bots. See [Google Chrome browser extension requirements](#) on page 308.

Scenarios

To configure your system to run the Google Chrome extension, choose the scenario that applies to you and follow the steps.

- [If you are using Recorder package version 2.0.9 or later:](#) on page 843

- If you are using Recorder package version 2.0.6, 2.0.7, or 2.0.8 (Version A2019.16 or earlier) on page 843
- If you are using Recorder package version 2.0.5 or earlier, and have never installed Automation Anywhere Enterprise Version 11.3 or later on your device on page 844
- If you are using Recorder package version 2.0.5 or earlier, and have Automation Anywhere Enterprise Version 11.3 or later installed on your device on page 844
- If you uninstalled Automation Anywhere Enterprise Version 11.3 or later from your device on page 845

Other Google Chrome extension troubleshooting scenarios:

- [Google Chrome extension installed in Microsoft Edge](#) on page 845
- [If you are not able to view the Google Chrome extension in offline mode](#) on page 845

If you are using Recorder package version 2.0.9 or later:

1. Verify that Google Chrome extension version 1.1.0.1 is installed and enabled.
2. Open the Windows registry to the Google Chrome browser agent: `Computer\HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Google\Chrome\NativeMessagingHosts\automation.bot.browseragent`
3. Verify that the registry entry points to the Enterprise A2019 Bot agent installation directory: `C:\Program Files\Automation Anywhere\Bot Agent\AABrowserAgent\AAChromeAgentManifest.json`

If this configuration is missing, reinstall the Bot agent.

If you are using Recorder package version 2.0.6, 2.0.7, or 2.0.8 (Version A2019.16 or earlier)

1. Verify that Google Chrome extension version 1.1.0.1 is installed and enabled.
2. Open the Windows registry to the Google Chrome browser agent: `Computer\HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Google\Chrome\NativeMessagingHosts\automation.bot.browseragent`
3. Verify that the registry entry points to the Enterprise A2019 global cache: `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\<Recorder package version>\AAChromeAgentManifest.json`

For example, `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\2.0.6-20200626-193519-1bd6fcecb-b036-4202-9932-4dc18349bd5c\AAChromeAgentManifest.json`

If this configuration is missing, do the following steps as an admin:

- a. Open the Enterprise A2019 global cache: `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\<Recorder package version>`
- b. Run the `install.ps1` file.
- c. Repeat steps 2 and 3 to verify the registry entry is updated.

If you are using Recorder package version 2.0.5 or earlier, and have never installed Automation Anywhere Enterprise Version 11.3 or later on your device



Note: Use latest Recorder package version available in your Enterprise Control Room.

1. Verify that Google Chrome extension version 11 or 12 is installed and enabled.
2. Open the Windows registry to the Google Chrome browser agent:
`Computer\HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`
3. Verify that the registry entry points to the Enterprise A2019 global cache: `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\<Recorder package version>\AACHromeAgentManifest.json`
 For example, `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\2.0.6-20200626-193519-1bd6fceb-b036-4202-9932-4dc18349bd5c\AACHromeAgentManifest.json`
 If this configuration is missing, do the following steps as an admin:
 - a. Open the Enterprise A2019 global cache: `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\<Recorder package version>`
 - b. Run the `install.ps1` file.
 - c. Repeat steps 2 and 3 to verify the registry entry is updated.
4. Verify that the browser agent `Automation.BrowserAgent.exe` is running with the Google Chrome extension installed and enabled.

If this configuration is missing, restart Google Chrome. Either disable and enable the Google Chrome extension, or close all Google Chrome browser tabs and reopen a new window.

If you are using Recorder package version 2.0.5 or earlier, and have Automation Anywhere Enterprise Version 11.3 or later installed on your device

1. Open the Windows registry to the Google Chrome browser agent: `Computer\HKEY_CURRENT_USER\Software\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`
 - If the above key is available, disable the Google Chrome plug-in version 11.x and enable the Google Chrome plug-in version 12.x.
 - If the above key is not available, disable the Google Chrome plug-in version 12.x and enable the Google Chrome plug-in version 11.x.
2. Restart Google Chrome. Either disable and enable the Google Chrome extension, or close all Google Chrome browser tabs and reopen a new window.
3. Verify that the browser agent `Automation.BrowserAgent.exe` is running with the Google Chrome extension installed and enabled.

If you uninstalled Automation Anywhere Enterprise Version 11.3 or later from your device

Uninstalling the Enterprise client does not remove the Google Chrome extension and registry entries. To remove them manually, do these steps:

1. Disable Google Chrome extension 12.x.
2. Install and enable Google Chrome extension 11.x.
3. In the Windows registry editor, remove the following key: `Computer\HKEY_CURRENT_USER\Software\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`
4. Open the Windows registry to the Google Chrome browser agent:
`Computer\HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`
5. Verify that the registry entry points to the Enterprise A2019 global cache: `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\<Recorder package version>\AAChromeAgentManifest.json`

For example, `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\2.0.6-20200626-193519-1bd6fceb-b036-4202-9932-4dc18349bd5c\AAChromeAgentManifest.json`
6. Restart Google Chrome. Either disable and enable the Google Chrome extension, or close all Google Chrome browser tabs and reopen a new window.

Google Chrome extension installed in Microsoft Edge

Although Microsoft Edge browser settings allow extensions from the Chrome Web Store, we recommend that you do not install the Google Chrome extension in the Microsoft Edge browser. Installing it causes recording and runtime errors in bots that interact with the Google Chrome browser. Even if you did not manually install the Google Chrome extension, the auto-sync settings in the Microsoft Edge browser might have automatically installed the extension.

If you are not able to view the Google Chrome extension in offline mode

1. Drag the file `ChromeExtension.crx` to the Google Chrome extension tab.
This file is available in the same path where the `Automation.BrowserAgent.exe` file is available.
Enable the Enterprise A2019 Google Chrome extension.
2. If the Google Chrome extension is still not visible:
 - a. Verify if the registry entry `automation.chrome.agent` is available in the path `Computer\HKEY_CURRENT_USER`.

If it is not available, create the registry in the following path: `Computer\HKEY_CURRENT_USER\Software\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`

This entry should have the same path as the entry: `Computer\HKEY_LOCAL_MACHINE\Software\Google\Chrome\NativeMessagingHosts\automation.chrome.agent`
 - b. Go to the path `Computer\HKEY_LOCAL_MACHINE\Software\Google\Chrome\Extensions`.

For the 11.1.0.0 Enterprise A2019 Google Chrome extension ID `jjpdebaihkgkfpbgefmnnlafkahebn`, create a new string with the name `path`.

The value of the string will be the path of the `ChromeExtension.crx`, which is available in the same folder where the `AChromeAgentManifest.json` file is available.

For example, add the entry `C:\ProgramData\AutomationAnywhere\GlobalCache\embedded-resources\2.0.5-20200511-172840-1825fd43-19bc-4dd2-ac56-53a2aed4b0e4\ChromeExtension.crx` in the following locations:

- `Computer\HKEY_LOCAL_MACHINE\Software\Google\Chrome\Extensions (ExtensionID)`
- `Computer\HKEY_CURRENT_USER\Software\Google\Chrome\Extensions (ExtensionID)`

- c. Restart Google Chrome. Either disable and enable the Google Chrome extension, or close all Google Chrome browser tabs and reopen a new window.

Secure recording mode

When secure recording mode is enabled, the bots do not capture values of certain properties or store application images. This ensures that sensitive data is not stored in the bots. This setting only applies to bots that are created or edited after the mode is enabled.

A user with admin privileges must enable secure recording mode. See [Settings](#) on page 1131.

To capture objects in secure recording mode, ensure that the Recorder package is set to 2.0.0-20200318-020414 or higher. See [Manage Enterprise Control Room packages](#) on page 1098.

When you record a task in secure recording mode, the Preview window temporarily shows the captured area. This image is deleted after you close the bot.

You can update the following object properties after capturing an object:

Technology	Object property
Microsoft Active Accessibility/UI automation/Java	• Item name • Item value • Name • Parent • Value
HTML	• HTML InnerText • HTML name • HTML value

Recording tasks in applications that run on JRE 6

Use the Universal Recorder to capture objects from Java applet, web start, and desktop applications that run using Java Runtime Environment (JRE) 6.

Enterprise A2019 supports JRE 6 on both 32-bit and 64-bit systems. If JRE 6 is installed on the registered device, Java Access Bridge is automatically installed on that device.

If you have more than one version of JRE 6 installed on your device, Enterprise A2019 configures Java Access Bridge with the default version. To configure it to a different version, you must manually copy the required files to the corresponding directories. See [Java Access Bridge](#).

The first time you record a task in an application running on JRE 6, an error message might appear if the application is launched before Java Access Bridge is installed. Restart the application and proceed with recording the task.

AlSense for recording tasks from remote applications

AlSense is the artificial intelligence (AI) powered capability of Enterprise A2019 that helps you identify objects from an image or an application with a complex user interface (UI) and make automation in all environments faster and more accurate.

AlSense is suitable when object-based automation fails or is not efficient for automating tasks on applications that are accessed remotely, in a Citrix environment, and legacy applications.

Some of the issues that affect the accuracy of an automation task in a remote environment are as follows:

- In a Citrix environment, the automation platform receives an image of the application and does not have access to the actual UI elements.
- Screen resolution and scaling might not be the same on the host and client machines.
- The position of a UI element might change for web applications due to a different resolution on the Bot Runner machine.

AlSense uses computer vision to intelligently create dynamic linking between objects by determining their composition to deliver change-resilient automation. AlSense enables you to accurately automate applications even when labels and text change their position.



Important:

- Bots will fail if they contain actions from Recorder package versions 2.0.9-20201105-164103 or later and the AlSense package. You must delete the AlSense actions and recapture the objects using the integrated recorder icon. [An integrated Recorder](#) on page 836
 - AlSense Recorder supports the English and Simplified Chinese languages. When recording an application, ensure that the device locale is set to the same language as that application.
-

Related tasks

[Record a task with AlSense Recorder](#) on page 847

Use the AlSense Recorder to record an end-to-end task on a remote application or an application with a complex user interface (UI).

[Edit a task recorded using AlSense](#) on page 849

After you have recorded a task using the AlSense Recorder, you can edit the recorded actions to perform various actions on the captured objects.

Record a task with AlSense Recorder

Use the AlSense Recorder to record an end-to-end task on a remote application or an application with a complex user interface (UI).

- If you are automating a task using a browser, ensure that auto-fill is disabled for that browser.
- The screen resolution must be set to 1980x1080 or lower.
- Configure the device display settings to 100% DPI.

- If you are using Enterprise A2019 On-Premises, ensure that the AISense Recorder package is added to your Enterprise Control Room.

AISense Recorder can capture the following objects from an application: text boxes, buttons, radio buttons, combo boxes, table, check boxes, active and passive text, image button, scroll, and combo box.

Keep the following considerations in mind when recording a task:

- Record the task at low speed.
- Avoid dragging windows during the recording process.
- Avoid clicking applications that are not part of the process you are recording to automate.

To record a task using the AISense Recorder, follow these steps:

1. From Automation Anywhere web interface, select BOTS > My bots.
2. Create a new bot or open an existing bot for which you want to record a task.
3. Click Start recording.



Note: In versions 2.0.9-20201105-164103 and later, the Recorder package contains both the Universal Recorder and AISense Recorder.

[An integrated Recorder](#) on page 836

The Automation Anywhere Recorder window appears.

4. Select a window from the drop-down list.

If you opened an application recently and it is not available in the list, click the Refresh icon.

5. Click AISense Recorder.

The first time you use the AISense Recorder on a device, the Recorder downloads the required dependencies.

The Recorder toolbar appears with Finish, Scan, Define, and Pause options.

The Recorder analyzes the application window you selected to identify the UI objects in that window. The options on the toolbar are disabled when the system is analyzing the application window. After the analysis, the options are enabled and you can start recording the task.

6. Perform the actions to record. For example, click buttons, fill in forms, or select an option.

To perform an action on an object, move the mouse pointer on that object. The system highlights an object along with the text associated with that object. For example, when you move the mouse pointer over a button or check box, the associated text with that button or check box is also highlighted and captured.

- If the object is not highlighted, click the Scan option on the recording toolbar. After the system finishes analyzing the application window, you can capture the required object.
- If you want to capture an option from a list, click the list and wait until the highlight appears around the box containing the options. After the box is highlighted, move the mouse pointer over the option you want to capture and wait until the option is highlighted.
- If you use scroll on an application window, you must click Scan to analyze the new objects on the window.
- If you want to record an interaction with an object that is only visible when you hover the mouse over the object, see [Detect hidden objects manually](#)

The Recorder window contains the number of operations recorded and a description of the most recently captured object. For example, 5. Left click on button 'Submit'.

To redo the previous object capture, click the Delete icon at the bottom right of the Recorder window to discard the most recent capture.

If Secure recording mode is enabled, a shield icon appears to the right of the red recording icon.

[Secure recording mode](#) on page 846

7. Click Finish after you finish capturing all the necessary objects.
A Capture action is generated for each operation.
Where applicable, the Recorder generates variables. [User-defined variables](#) on page 869
8. Edit the actions or click Save.
[Edit a task recorded using AISense](#) on page 849

Detect hidden objects manually

If an object is only visible when you hover the mouse over the object, you must manually specify the object type and location by anchoring it to the nearest text:

1. Click the object once.
2. Click Define.
The AISense Define main object window appears with a screenshot of the application, where the object is visible.
3. Click and drag a rectangle to outline the object to capture.
4. In the Supporting anchor list, select the text that is closest to the object you are capturing.
5. Click Apply.

Related tasks

[Edit a task recorded using AISense](#) on page 849

After you have recorded a task using the AISense Recorder, you can edit the recorded actions to perform various actions on the captured objects.

Related reference

[AISense for recording tasks from remote applications](#) on page 847

AISense is the artificial intelligence (AI) powered capability of Enterprise A2019 that helps you identify objects from an image or an application with a complex user interface (UI) and make automation in all environments faster and more accurate.

[Actions performed on objects captured with AISense Recorder](#) on page 851

After you capture objects using the AISense Recorder, you can perform various actions that a bot can perform on the object at runtime.

Edit a task recorded using AISense

After you have recorded a task using the AISense Recorder, you can edit the recorded actions to perform various actions on the captured objects.

Edit a recorded task to do the following:

- Change the application window in which you want to perform the operation, or add a wildcard to the window title.
- Change the properties of the captured objects.
- Specify the action you want to perform on the captured objects.
- Introduce a delay before the next action is performed.
- Specify the variable you want to use to store the output.



Important: Only the following types of objects are supported with AISense Recorder:

- Text boxes
- Check boxes
- Combo boxes

- Radio buttons
- Buttons
- Table
- Active text

Active text is the text that you can click. For example, link, menu, text on a navigation pane, and so on.

- Passive text

Passive text is the text that you can only read.

- Image button

An image button is a button that contains only image and does not have any text associated with it. For example, icons for delete, copy, cut, paste, and so on. You can capture image buttons that are hidden on the application screen and appear when you move the mouse pointer on the image buttons.

- Scroll on an application window and combo box

To edit a recorded task, follow these steps:

1. Open the bot that contains the recorded actions you want to edit.
2. Click the Capture action that you want to edit.

Make the following changes, as necessary:

3. Click the Window tab or the Variable tab to specify a different application window on which you want to perform the operation.

If you have used the Window tab to specify the application window, you can use a wildcard character in the Window title field. The wildcard character is useful if the title of an application changes. For example, `Sample* - Google Chrome`.



Note:

- During runtime, verify that the TaskBot identifies the correct window.
- If you use scroll on an application window, you must click the Analyze window option to analyze the new objects on the window.

-
4. Update the object properties.

You can only update the value available in the Anchor field.

5. Select an option from the Action list to specify the action you want to perform on the object.

For a full list of possible actions by object, see [Actions performed on objects captured with AISense Recorder](#) on page 851.

6. Optional: Enter a value in the Wait for control field to specify the number of milliseconds the bot must wait for the object control to appear on the application window.

We recommend setting a delay time when using the Set text action to enter keystrokes into a text field.

7. Optional: Assign the output to a variable.
8. Perform the Steps 2 through 7 for the other actions that you want to edit in the bot.
9. Click Save.

Actions performed on objects captured with AISense Recorder

After you capture objects using the AISense Recorder, you can perform various actions that a bot can perform on the object at runtime.

For example, when you capture a button, you can select to click the button or to retrieve the button text. The following table lists the objects and their possible actions.

Object	Actions
Button	• Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. • Click: Use this action to select the captured object. • Left click: Use this action if the Click action does not work during runtime. • Right click: Use this action to perform the right-click operation on the captured object. • Double click: Use this action to perform the double-click operation on the captured object.
Image button	• Left click: Use this action if the Click action does not work during runtime. • Right click: Use this action to perform the right-click operation on the captured object. • Double click: Use this action to perform the double-click operation on the captured object.
Active text	• Left click: Use this action if the Click action does not work during runtime. • Right click: Use this action to perform the right-click operation on the captured object. • Double click: Use this action to perform the double-click operation on the captured object.
Passive text	• Get text: Retrieves text available in the area you have specified.
Check box	• Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. • Get status: Retrieves whether the check box is selected. Returns checked or unchecked. • Check: Selects the captured check box. • Uncheck: Clears the captured check box. • Toggle: Switches the check box to the opposite status. For example, if the check box is selected, use the Toggle action to clear it. • Left click: Use this action if the Toggle action does not work during Runtime. • Right click: Use this action to perform the right-click operation on the captured object. • Double click: Use this action to perform the double-click operation on the captured object.

Object	Actions
Combo box (appears as a drop-down list)	- Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. - Get selected text: Retrieves text from the selected item. - Select item by text: Selects the item that matches the text you have specified in the Assign value field.  Note: The Assign value field is case-sensitive. - Expand: Expands the combo box. - Click: Use this action to select the captured object. - Left click: Use this action if the Click action does not work during runtime. - Right click: Use this action to perform the right-click operation on the captured object. - Double click: Use this action to perform the double-click operation on the captured object.
Scroll bar (within a combo box)	- Scroll Up: Performs the scroll up operation. This action is similar to clicking the scroll up button one time. - Scroll Down: Performs the scroll down operation. This action is similar to clicking the scroll down button one time. - Page Up: Performs the page up operation. This action is similar to holding the scroll bar and moving it up. The distance by which the scroll bar is moved up is specified in the Scroll Distance field. - Page Down: Performs the page down operation. This action is similar to holding the scroll bar and moving it down. The distance by which the scroll bar is moved down is specified in the Scroll Distance field. - Left click: Use this action if the Click action does not work during runtime. - Right click: Use this action to perform the right-click operation on the captured object. - Double click: Use this action to perform the double-click operation on the captured object.
RadioButton	- Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. - Get status: Retrieves whether the radio button is selected. Returns selected or deselected. - Select: Use this action to select the captured radio button. - Left click: Use this action if the Click action does not work during runtime. - Right click: Use this action to perform the right-click operation on the captured object. - Double click: Use this action to perform the double-click operation on the captured object.

Object	Actions
Table	- Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. - Get table: Retrieves the table data and saves it to a table variable. Example of extracting data from a web table on page 888 - Get cell text by index: Retrieves the data in the specified cell located at the row and column index.  Note: Row and column index counts start at 1. For example, to retrieve the data in cell A2, enter 1 in the Row field and 2 in the Column field. - Get total rows: Retrieves the number of rows that contain values. - Get total columns: Retrieves the number of columns that contain values. - Set cell by index: Enters text into the cell located at the row and column index.  Note: Row and column index counts start at 0. For example, to enter text into cell A2, enter 0 in the Row field and 1 in the Column field. - Click: Use this action to select the captured object. - Left click: Use this action if the Click action does not work during runtime. - Right click: Use this action to perform the right-click operation on the captured object. - Double click: Use this action to perform the double-click operation on the captured object.
TextBox	- Get property: Retrieves the value of the specified property of the captured object (such as the link text) and saves the value in a variable. - Set text: Enters the text you have specified in the captured field. It supports credentials. Credentials and credential variables in the Bot editor on page 878 - Append text: Adds text at the end of existing text in the captured field, instead of overwriting it. - Click: Use this action to select the captured object. - Left click: Use this action if the Click action does not work during runtime. - Right click: Use this action to perform the right-click operation on the captured object. - Double click: Use this action to perform the double-click operation on the captured object.

Use variable anchor

The variable anchor in the AISense Recorder enables you to perform an action on multiple objects of the same type.

You can either duplicate the action added for the variable anchor object to perform the action on the same object type or use the action within a Loop action.

1. From Automation Anywhere web interface, select BOTS > My bots.
2. Create a new bot or open an existing bot for which you want to record a task.
3. Click Start recording.



Note: In versions 2.0.9-20201105-164103 and later, the Recorder package contains both the Universal Recorder and AISense Recorder.

[An integrated Recorder](#) on page 836

The Automation Anywhere Recorder window appears.

4. Select a window from the drop-down list.

If you opened an application recently and it is not available in the list, click the Refresh icon.

5. Click AISense Recorder.

The first time you use the AISense Recorder on a device, the Recorder downloads the required dependencies.

The Recorder toolbar appears with Finish, Scan, Define, and Pause options.

The Recorder analyzes the application window you selected to identify the UI objects in that window. The options on the toolbar are disabled when the system is analyzing the application window. After the analysis, the options are enabled and you can start recording the task.

6. Click an object or area on the application window that is not highlighted.
7. Click Define.

The AISense Define main object window appears with a screen shot of the application.

8. Select the Control Type.
9. Click and drag a rectangle to outline the object to capture.
10. In the Supporting anchor list, select text that is closest to the object you are capturing.
11. Click Apply.
12. Click Finish after you have captured the required objects.

The recorded steps appear as a separate action in the bot.

You can duplicate the action added for the variable anchor and update the value in the Anchor field with the anchor text of the object you want to capture, for each variable anchor action. Alternatively, use the action within the Loop action and use a variable that supports the string data type in the Anchor field.

13. Click Save to save the bot.

Working with bots

Depending on the license and permission assigned to you, you can perform various bot operations and access the private and public workspaces in the Enterprise Control Room.

Licenses

Two types of licenses are available: Bot Creator and Bot Runner (attended or unattended) licenses.

[Enterprise A2019 licenses](#) on page 392

Bot Creator tasks

A Bot Creator user can access both the private workspace and public workspace in the Enterprise Control Room (Bots > My bots page). The license provides the user exclusive access to the registered device. Other users cannot use the default device of a Bot Creator.

With the Bot Creator license and specific permissions, you can perform the following tasks:

- [Create a bot](#)
- [Run a bot](#) on page 856
- Record a bot
 - [Record a task with the Universal Recorder](#) on page 838|[Record a task with AISense Recorder](#) on page 847
- [Schedule a bot](#) on page 1058
- [Copy a bot](#) on page 860
- [Export a bot](#)
- [Import a bot](#)
- [Check in a bot](#) on page 857
- [Check out a bot](#) on page 858

You can also edit, analyze, save, clone, view content, delete, pause, or stop a TaskBot.

Bot Runner tasks

A Bot Runner can access only to the public workspace in the Enterprise Control Room. They cannot create or edit bots.

With the Bot Runner license and specific permissions, you can perform the following tasks:

- [Run a bot](#) on page 856
- [Schedule a bot](#) on page 1058

You can also view the content of a TaskBot.

Public and private workspaces

Depending on the license, users logging in to the Enterprise Control Room can access the private and public workspaces.

Private workspace

Users with the Bot Creator license can access the private workspace. This workspace is primarily used to create and test bots. It enables users to view and manage all their activities in one primary location. Bots in the private workspace is available only to the users who created them.



Note: Users with administrative privileges and Bot Runner license cannot access the private workspace because they cannot create bots.

Public workspace

Both Bot Creator and Bot Runner users can access the public workspace. This is a shared workspace where you can execute the bots.

Users with the Bot Runner license can run bots created by the Bot Creator user. Bots created in the private workspace by Bot Creators can be made available to specific Bot Runner users in the public workspace by defining the permissions at the folder or file level. To do this, users have to first check in the bot from the private workspace to the public workspace.

Run a bot

You can test an automated process by running a bot.

1. Log in to the Enterprise Control Room.
2. From the Bots > My bots page, run the bot in the following ways:
 - Select the bot to run. Mouse over the actions menu (vertical ellipsis) located to the right of the bot name and click Run Task Bot > Run bot now.
 - Click the bot name. When the bot opens in the Bot editor, click Run.
 - Click Run bot > Run bot now. Enter the required details in the Run bot now page and click Run bot now.

Search the TaskBot folders, BOTS, or DEVICES to find a specific bot. Search for a specific item by name or type using the drop-down list and search field.

You can also run bots from the In progress and My devices pages.

If you encounter issues in running a bot, refer to the following articles:

- [Unable to run bot \(A-People login required\).](#)
- [There is already an existing deployment in-progress for this user session \(A-People login required\).](#)

Repeating a bot

Repeat a bot after run failure or when running routine bots.

Options for repeating a bot

Do Not Repeat	Default. The bot runs once.
Repeat	Repeats the bot a number of times.
Repeat until I stop it	Repeats the bot until being stopped manually by clicking the stop button or by pressing the ESC key.
Repeat for	Repeats the bot for a time period (hh:mm:ss).
	 Note: Specify up to 99 hours, 59 minutes, or 59 seconds.
Time between repeats	Sets a duration of time to wait before repeating a bot.
Upon error, continue with next repeat	The bot is repeated regardless of run failure.

Considerations for running a bot

There are certain considerations you have to keep in mind when running a bot.

- As a Bot Creator, you can deploy a bot on your device or you can run the bot on a remote machine through RDP connection.
- If you are running bots on your local machine as a Bot Creator, enter only your username in the device login credentials; no password is required. The username is required to confirm that the same user who logged in to the local device is deploying the bot. If you are using the Google Chrome plug-in and running bots on your local machine, your username is required.
- As a Bot Runner, you can either deploy the bot yourself or select a run-as user assigned by the administrator. You can run the bot either through your device or choose from the list of devices in a device pool. If you choose to override the default device, the bot will be executed on any available device in the device pool for each run-as user.
- You can preload packages on your local device to shorten the bot runtime.
The system supports running only one bot for each device at a given time. If a bot is already running on the device, you cannot deploy another bot on the device.
- If you are running a bot from the Bot editor, closing the Enterprise Control Room web browser will stop the bot run.
- Run-as user: A set of unattended Bot Runner users that a scheduler can select from to run a bot on a device. The run-as user can select an available device from the device pool to run the bot.

Check in a bot

Check in the TaskBot files or folders to the public workspace from the private workspace to make it available for all users who have the permission to access and run the TaskBot.

- You must have a Bot Creator license.
- You must be assigned a custom role with the following permissions:

- Required: Check-in permission at the folder level and at the corresponding parent folder level in the public workspace.
- Optional: Create folder permission.
- Optional: View packages permission.
- To check in a bot with dependent folders and files, ensure you have the following:
 - Create folder permission.
If you are checking in a bot from your private workspace and if the folder in which the bot is present does not yet exist in the public workspace, you must have create folder permission to successfully check in the bot.
 - Check in permission on the dependency folder.
- Ensure that your private and public workspaces have the same folder structure so that when you check in a bot from your private workspace, it will appear in the same folder structure in the public workspace.
- For example, if you check in a bot from the sample bot folder in the private workspace, it will appear in the sample bot folder in the public workspace.

If you want to check in multiple bots as a unit that are not dependent on each other, create a main bot and then add the other bots as dependencies to this main bot. Check in the main bot.

1. Log in to the Enterprise Control Room as a Bot Creator user.
2. In the private workspace, click Bots > My bots.
The My bots page is displayed with the list of folders or files containing the bots.
3. Select the bot you want to check in, click the actions menu (vertical ellipsis), and click Check in Task Bot.
4. In the Check in Task Bot window, add your comment and click Check in.
The bot appears in the same folder structure in the public workspace. When you check in a TaskBot files or folders, all the linked files will be checked in.



Note: You cannot check in a TaskBot file if another TaskBot file already exists in the same location in the public workspace.

If you have issues in checking in a bot, see [Unable to check-in the bots in A2019 \(A-People login required\)](#).

Check out a bot

Check out TaskBot files or folders from the public workspace to create an editable copy of the bot.

- Ensure you have the Bot Creator license to check out a bot to your private workspace.
- You must have check-out permission at the folder level.
- To check out a bot with dependent folders and files, you must have the check-out permission on the dependency folders.
- To cancel or undo a check-out performed by the Bot Creator user, you must have the Cancel checkout and View content permissions on public workspace.

You do not require the Cancel checkout permission to cancel the checked-out bot from the private workspace.

While checking out bot, keep the following considerations in mind:

- If you want to check out multiple bots as a unit that are not dependent on each other, create a main bot and then add the other bots as dependencies to this main bot. Check out the main bot.

- Only one user can check out a file at a time. When a user checks out a file, it cannot be checked out by any other user.
- When you check out a TaskBot or file, all its dependencies are also checked out.
- If you are checking out a parent bot in the public workspace whose dependencies are checked out by another user, the dependencies of the parent bot will be cloned in your private workspace.
- If a bot is checked out, it cannot be deleted. The bot should be in a checked-in state to be deleted.
- When you edit a checked-out bot, the status changes to Checked out edited.

You can use the Revert edits option to revert changes you made to the checked-out bot.

1. Log in to the Enterprise Control Room as a Bot Creator user.
2. In the public workspace, click Bots > My bots.
The My bots page is displayed with the list of folders or files containing the bots.
3. Select the bot, open the actions menu (vertical ellipsis), and click Check out Task Bot.
The bot will appear in the same folder structure in the private workspace. When you check out TaskBot files or folders, all the dependencies linked to the TaskBot files or folders will be checked out.



Note: Only one user can check out a TaskBot at a time. When a user checks out a TaskBot, it cannot be checked out by any other user.

4. To cancel the checked-out bot, click the Cancel check out Task Bot option.
You can use this option from either the public or the private workspace.
In the public workspace, the bot status changes to public and the bot is available for check-out by another user with the appropriate permissions.

In the private workspace, the bot status changes to new if any changes were made to the bot. If there are no changes, the bot is replaced with a clone.

Clone a bot

Create a read-only copy of the bot from the public workspace to the private workspace so that you can have a local copy without checking out the bot.

- Create a user with a Bot Creator license.
- Create a custom role with the clone permission assigned at the folder level to the user.
- To clone a dependency folder, you must have the clone permission on the dependency folder.

Cloning a bot does not affect other users' access to the bot in the public workspace. A bot can be cloned by multiple users.

1. Log in to the Enterprise Control Room as a Bot Creator user.
2. In the public workspace, click Bots > My bots.
The My bots page is displayed with the list of folders or files containing the bots.
3. Select the bot you want to clone, click the actions menu (vertical ellipsis), and click Clone Task Bot.
The cloned bot appears in the same folder structure in the private workspace.

Preload packages

You can preload packages on your local device to shorten the bot runtime.

When you run a bot, the system downloads the bot and all the packages used in the bot. Bot execution begins when the download finishes. If the packages used in the bot are preloaded, the system skips the package download process and starts executing the bot, thereby reducing the bot execution timeframe.

Preloaded packages are stored in `\ProgramData\AutomationAnywhere\GlobalCache` on the local machine.

If there are multiple versions of a package, only the default package is preloaded. You can only preload packages on your local devices.

1. Log in with a Bot Creator account.
2. Click the My Devices > Preload package icon in the menu item associated with your local device.



Note: The Preload package option is also available from the device icon drop-down menu for Enterprise A2019 (Cloud deployed) using the Google Chrome browser with the Chrome plug-in enabled.

3. In the Preload packages window, preload either all packages listed on the Common packages page, or select individual packages from the Customize packages page.
Common packages represent the most lightweight and most commonly used packages.
4. Click the Start preloading option.

Copy a bot

Copy a bot to create a duplicate sequence of actions within your private repository. The copy retains the meta-data of the original bot including captured images, recorded objects, called files, and child bots.

To copy a bot, follow these steps:

1. From Automation Anywhere web interface, select Bots > My bots.
2. Mouse over the actions menu.
The actions menu is the vertical stack of three dots to the left of each bot.
3. Click the Copy Task Bot icon.
4. In the Name field, enter a name for the duplicate bot.
5. Optional: Click Browse to select the folder where to save the bot.
6. Click Copy.
The duplicate bot appears in the specified folder.

Editing bots

Edit bot logic using the Bot editor to add, modify, or delete actions and automation steps.

Open a bot

Open a bot in the Bot editor in one of the following ways:

- Select the bot and click Edit. The edit button is a pencil icon.
- Right-click on the bot and select Edit.
- Click Actions and select Edit.

Attach work item template to TaskBot

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

When you attach a work item template to a TaskBot, you can use the variable `$WorkItem$` that contains the attributes for the required workload automation when you run the bot using the Run bot with queue option.

[Use Work Item variables](#) on page 877

1. Create or edit a TaskBot from the My bots page.
The TaskBot opens in edit mode.
2. Select the option Work item template from the menu at the top-right of the Workbench.
The list of Work item templates appears.
3. Select the template that best suits your workload automation requirement.
4. Click the right arrow to add the template.
The Work item template attributes are listed for the selected template.
5. Click Save.
6. Choose one of the following actions:
 - Click Close to return to the My bots page.
 - Click Return to editor to continue editing the TaskBot.

Related concepts

[Workload management](#) on page 1079

The workload management module enables users to upload Microsoft Excel and CSV files to the Enterprise Control Room so that it feeds the records from the files into the bot deployments.

Related tasks

[Use Work Item variables](#) on page 877

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

Related reference

[Workload package](#) on page 831

The Workload package enables you to insert work items in a queue for workload automation. It also enables data chaining between multiple queues. You can orchestrate multiple bots, and enable optimal device utilization through the queueing mechanism of workload management.

Viewing package versions available in the Enterprise Control Room

Actions are grouped into version-specific packages. Bot Creators can select which package version to use for a specific bot.

Basic users can only view the packages available in the Enterprise Control Room and the specific package details.

Bot Creators require the AAE_Basic permission to select specific packages to use within a bot.

Go to the Bots > Packages page to view all the packages in the Enterprise Control Room.

Supported packages

Package	Version
Active Directory	2.2.0-20210118-184951
Analyze	2.2.4-20210111-081613
App Integration	3.0.0-20210118-184955
Application	2.1.0-20210118-184957
Boolean	2.1.0-20210118-184958
Bot Migration	3.1.0-20210121-020133
Browser	2.3.0-20201211-222811
Clipboard	2.1.0-20210118-185007
Comment	2.4.0-20210118-185007
CSV/TXT	2.3.0-20210118-185008
Data Table	2.6.0-20210118-185831
Database	2.4.0-20210124-164040
Datetime	2.2.0-20210118-185018
Delay	2.2.0-20210118-185019
Dictionary	3.2.0-20210118-185020
Email	3.3.0-20210109-150633
Email Trigger	1.2.0-20210110-045434
Error handler	2.4.0-20210118-185029
Excel basic	2.4.0-20210118-185451
Excel advanced	5.4.0-20210117-080101
File	3.2.0-20210118-185031
File/Folder Trigger	1.1.0-20210120-001902
Folder	3.1.0-20210118-185034
Forms	2.19.0-20210121-170256
FTP / SFTP	2.2.0-20210118-185037
Hotkey Trigger	1.0.0-20200624-103826
If	2.1.0-20210118-185039
Image Recognition	2.2.0-20210118-185041
Interface trigger	1.1.0-20210120-001902
IQ Bot	2.0.2-20210113-124647
IQ Bot [Local Device]	3.0.1-20210107-163434
	3.0.1-20210202-065810

Package	Version
IQ Bot Pre-processor	2.1.0-20200904-111545
JavaScript	2.5.0-20210118-185244
Simulate keystrokes	2.7.0-20210123-225248
Legacy Automation	3.3.0-20210121-015801
List	2.2.0-20210118-185319
Log To File	2.2.0-20210118-185320
Loop	2.1.0-20210118-185321
Message Box	2.1.0-20210118-185321
Mouse	2.2.0-20210118-185327
Number	2.3.0-20210118-185335
OCR	2.4.0-20210118-185337
Office 365 Excel	2.2.0-20210113-090417
Office 365 Calendar	2.1.0-20210111-081624
Office 365 OneDrive	2.2.0-20210118-185438
PDF	2.8.0-20210118-185443
PGP	2.2.0-20210118-185445
Ping	2.1.0-20210118-185446
Play Sound	2.2.0-20210112-035032
Process	3.0.0-20210129-004015
Process Discovery	2.0.10-20210129-053548
Printer	2.1.0-20210112-035039
Prompt	2.2.0-20201109-192507
Python Script	2.5.0-20210128-041208
Recorder	2.0.11-20210128-034104
REST Web Service	3.2.0-20210122-190134
Run DLL	3.4.0-20210118-185806
SAP	2.2.0-20210118-185808
Services	3.0.0-20210118-185816
Screen	2.2.0-20210118-185815
SNMP	2.1.0-20210118-185818
SOAP Web Service	3.2.0-20210112-035232
Step	2.0.0-20210128-041514
String	3.2.0-20210118-185827
System	3.1.0-20210122-195716

Package	Version
Task Bot	2.0.1-20210128-041521
Terminal Emulator	3.7.0-20210117-080825
Trigger Loop	0.5.0-20210120-001846
V11 Task Bot	1.5.0-20201125-004358
VBScript	2.5.0-20210128-041527
Wait	3.1.0-20210118-185841
Window	2.4.0-20210118-123115
Workload	2.5.0-20210121-020041
XML	2.2.0-20210118-185847

Select the package version used in your bot

As a Bot Creator you have the ability to select which package version to use for a set of actions within your bot.

You need to have AAE_Basic permission.



Tip: For existing bots, follow these steps to update to the default package.

1. Open or create a new bot from Bots > My bots.
2. Click the vertical ellipses in the upper right corner, and select Packages.



Note: The packages used in the selected bot are highlighted.

3. Click the drop-down list to view which version of the package is currently used for this bot.
4. To change the package version to be used for this bot, select the package version to use from the drop-down list of available packages.
5. Click Change version.
6. Click Save.

Keyboard shortcuts

List of keyboard shortcuts supported.

All modes - Flow or List view

Keys	Action
Esc	Closes node details or clear cursor
Tab	Toggles Flow or List view
Enter	Shows node details and focus first input
Space	Toggles node details
Ctrl A	Selects all nodes

All modes - Flow view

Keys	Action
Up	Moves cursor up
Down	Moves cursor down
Left	Moves cursor left
Right	Moves cursor right

All modes - List view

Keys	Action
Up	Moves cursor up
Down	Moves cursor down

Edit mode

Keys	Action
Ctrl S	Saves file
F5	Run
F10	Enters debug mode
Shift F9	Toggles all breakpoint

Edit modes - Flow or List view in focus

Keys	Action
Ctrl Shift R	Starts recording
Ctrl /	Enables or disables mode
F9	Toggles node breakpoint
Ctrl C	Copy node
Ctrl X	Cut node
Ctrl V	Paste node
Delete	Delete node
Ctrl Z	Undo
Ctrl Y	Redo

Debug mode

Keys	Action
F5	Play/pause/restart
F6	Step next
F7	Stop
F10	Exits debug mode
Shift F9	Toggles all breakpoints

Debug mode - Flow or List view in focus

Keys	Action
F9	Toggles node breakpoints

Node details

Keys	Action
Ctrl Enter	Accepts current input and saves the action or trigger

Variables overview

Enterprise A2019 offers a variety of variables, each designed to hold specific types of data and is intended for specific use. Use the topics below to learn more about each variable and how to use them.

[Credentials and credential variables in the Bot editor](#) on page 878

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

[System variables](#) on page 867

System variables are predefined variables that return specific values about the machine on which the bot is executed. Users cannot edit the values of a system variable.

[User-defined variables](#) on page 869

Users and some actions create user-defined variables to temporarily hold values. Use this kind of variable to input values into an action (window title, login credential, or file path) or to accept the output of an action (values read from a file or a Boolean return).

[Create a variable](#) on page 873

[Global values](#) on page 882

Global values enable users to reuse identical values between bots instead of creating new variables for each bot. A user with the `AAE_admin` role configures a global value with a default value and can enable non-admin users to overwrite the value to use in their bots.

[Work Item variables](#)

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

Watch the following video on how to use variables:

To learn more, search for the Did You Know that You can Build Powerful Automation Using Variables and Advance Data Type Commands? course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

System variables

System variables are predefined variables that return specific values about the machine on which the bot is executed. Users cannot edit the values of a system variable.

System variable types include clipboard, date time, and string.

Clipboard

Use the actions in the Clipboard package to perform operations on the clipboard variable. See [Clipboard package](#) on page 546.

Variable	Description
Clipboard	Returns the contents of the clipboard.

Date time

Use the actions in the Datetime package to perform operations on the date time variables. [Datetime package](#) on page 569

Variable	Description
Date	Returns the date including hours, minutes, and seconds.  Note: Hours can be in 24-hour or AM/PM format depending on the machine configuration.
Day	Returns the day in DD format.
Hour	Returns the hours in HH format.
Machine	Returns the device name as a string.
Millisecond	Returns the milliseconds with a value between 0 and 999.
Minute	Returns the minutes in MM format.

Variable	Description
Month	Returns the month in MM format.
Second	Returns the seconds in SS format.
Year	Returns the year in YYYY format.

String

Use the following variables to change how a string is displayed.

Variable	Description
Enter	Starts a new line. Starts a new line based on the operating system of the device. For example, the variable always adds a new line character in Linux CentOS. In Microsoft Windows, the variable adds a page break in the Microsoft Word application and a new line character in the Notepad application.
Newline	Starts a new line regardless of the application and operating system of the device.
Separator	Demarcates a separation between values with a <sep> value.
Tab	Creates large space.

System settings and parameters

Use the following variables to return data from the computer that is connected to the running Bot agent:

Variable	Description
AAControlRoom	Returns the URL of the Enterprise Control Room.
AAInstallationPath	Returns the Bot agent installation path. For example, C:\Program Files\Automation Anywhere\Bot Agent.
AATaskExecutor	Returns details on the Run-as user that is used to run a bot. If the bot is deployed on an attended Bot Runner, this variable returns information about the logged-in user. If the bot is deployed by a trigger, this variable returns information about the user associated with that Bot Runner license. This variable is a dictionary with the following keys: • Executor_username • Executor_firstname • Executor_lastname • Executor_email
AATaskName	Returns the path and name of the currently running TaskBot. For example, /Bots/Finance/combineSheets.atmx.

Variable	Description
CPUUsage	Returns the percentage utilization of the CPU. Use this variable in a Wait for condition action to make the bot wait until machine CPU usage decreases to a specific amount. See Wait package on page 824.
Machine	Returns the name of the computer.
RAMUsage	Returns the RAM usage in megabytes. Use this variable in a Wait for condition action to make the bot wait until machine RAM usage decreases to a specific amount. See Wait package on page 824.
OSName	Returns the operating system. For example, Windows 10 64-bit.
TotalRAM	Returns the total amount of RAM available.

- Version 11.3 contained Email, File, and PDF system variables, which could hold a limited number of properties values. In Version A2019, an infinite amount of Email, File, and PDF properties values are stored in User-defined Dictionary variables. For more information, see [Using dictionary variable for email properties](#) on page 597 and [Using a dictionary variable for PDF properties](#) on page 740.
- Version 11.3 contained Excel system variables to return the cell, column, or row location. In Version A2019, the Excel Advanced package contains the following actions to return location values: [Get cell address](#), [Get column](#), and [Get row](#).
- Version 11.3 contained the Counter system variable to return the loop iteration count. In Version A2019, the user must create and configure a number variable.

User-defined variables

Users and some actions create user-defined variables to temporarily hold values. Use this kind of variable to input values into an action (window title, login credential, or file path) or to accept the output of an action (values read from a file or a Boolean return).

Variable types

The variable type dictates what kind of data the variable holds. Most variable types have a package with a similar name, which contains actions used to perform operations on the values stored in the variable. For example, use the actions in the String package to work on String variables. Similarly, to work on Number variables, use the actions in the Number package.

Variable naming

A variable name can contain a maximum of 50 Unicode characters, including numbers (0-9), Latin letters (A-Z, a-z), and special characters (- and _). You can use double-byte characters, such as Chinese, Japanese, or Korean characters, in a variable name. [Unicode range supported in variables](#) on page 876



Note: Variables cannot be named Java keywords such as String, Boolean, Integer, Public, and Finally.

We recommend using camel case for variable names and prefixing the variable name to indicate the scope and data type. For example, `oFileEmailAttachment` for a file type variable that is used to

provide an input. For more information about scope, see [Task Bot package](#) on page 804. This standard enables you to search for variables by type. For example, `oStx` returns variables that are used to hold output string values.

Variable types

Variable type and suggested name	Description	Use examples
Any Any	Stores Boolean, Data table, Datetime, File, Number, Record, String, or Window data types. Use this variable type when you are uncertain of which data type an action will output.	Example of using the Run action on page 900
Boolean Bool	Stores either a True or False value.	
Credential Cred	Stores string values securely, preventing values from being displayed in a message box or written to a file. The value is either selected from the Credential Vault or is user-provided. Credentials and credential variables in the Bot editor on page 878	
DateTime Date	Stores a value containing a single date and time value.	You can format the values by selecting a predefined format or specifying a custom format. Date time formats on page 573
Dictionary Dict	Stores data in the form of key-value pairs. The value can be boolean, number, or string.	Using dictionary variable for email properties on page 597 Using a dictionary variable for PDF properties on page 740
File File	Stores a file path.	
Form Form	Stores the value that was input into an interactive form field. Using interactive forms on page 931	

Variable type and suggested name	Description	Use examples
List List	Stores a sequence of boolean, number, or string values.	
Number Num	Stores numeric values, including integers and decimals. It holds values from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807, and up to 15 decimal digits. You can assign a randomly generated value to this variable. Random number action	You can remove the digits following a decimal when converting the value into a string. Number to string action
Record Rec	Stores a single row of values extracted from a table. The values can be boolean, datetime, number, or string. Record variable on page 875	Example of entering data into a web form from a worksheet on page 890
Session Sess	Stores the session name from the Excel basic, Excel advanced, or Terminal Emulator packages. Pass this variable from a parent to a child bot in the Task bot > Run action to enable the child bot to process the data in the file opened in the parent bot.  <u>Note: When initializing this variable in the child bot, select Use as input.</u>	Example of sharing an Excel session between bots on page 806
String Str	Stores alphanumeric and special characters, and empty values. It can hold up to 65535 UTF-8 characters. A string variable can hold multiple lines of text.	You can compare the value in a String variable to an empty String variable. Example of using a conditional statement on page 892
Table Table	Stores multiple values in a table of rows and columns. The values can be boolean, datetime, number, or string.	Assign values to a table variable by extracting values from a CSV/TXT file , Excel file , or a Web form .

Variable type and suggested name	Description	Use examples
Window Table	Stores a window title and URL.	Some actions, such as the Capture action, create a Window variable to store the specified window title and URL. Example of extracting data from a web table on page 888

Related tasks

[Create a variable](#) on page 873

Create a variable to store values.

Related reference

[Boolean package](#) on page 537

The Boolean package contains actions that enable you to do various operations on Boolean values.

[Data Table package](#) on page 549

The Data Table package contains actions that enable you to perform various operations on the values of table variables. Use these actions to join or merge content, search for specific values, insert rows and columns, remove duplicate rows, and write values to a file.

[Datetime package](#) on page 569

A datetime value consists of a date, time, and time zone. Automation Anywhere Enterprise stores datetime values in a Datetime variable. The Datetime package contains actions that enable you to perform various operations on datetime values. You can use these actions to manipulate and compare values in the Datetime variables.

[Dictionary package](#) on page 576

The Dictionary package contains actions that enable you to do various operations on dictionary-type values.

[List package](#) on page 684

The List package contains actions that enable you to perform various operations on a variable of the list data type.

[Number package](#) on page 698

The Number package contains actions that enable you to perform various operations on a number variable. A number variable holds numeric values, including integers and decimals. It holds values from -9,223,372,036,854,775,808 to 9,223,372,036,854,775,807, and up to 15 decimal digits.

[String package](#) on page 794

Use the String package to perform various operations such as comparing two strings, retrieving the string length, or converting a string to uppercase or lowercase.

[Type casting](#) on page 874

You can temporarily convert the values inside a Boolean, Number, or String variable from one type to another type to use within one action. For example, use `${YourStringVariable}.String:toNumber$` to convert the value of a string variable to a number variable to perform mathematical operations.

[Recursive expressions](#) on page 874

Use a recursive expression to insert a variable in the place of an index or key of a dictionary, list, record, or table variable.

Create a variable

Create a variable to store values.

To create and configure a variable, follow these steps:

1. From the Bot editor, click the Create variable icon at the top of the Variables menu.
The Variables accordion menu is located below the Actions menu.
2. In the Create variable window, enter a descriptive name for the variable that is prefixed by a lowercase letter to indicate the variable type.
For example, `sCellValue` to indicate a string data type.



Note:

- After the variable is initialized, you cannot change the name.
- You can use double-byte characters, such as Chinese, Japanese, or Korean characters, in a variable name. [Unicode range supported in variables](#) on page 876
- Variables cannot be named Java keywords such as String, Boolean, Integer, Public, and Finally.

3. Optional: Enter a description.
4. Optional: Select the Constant (read-only) option to ensure values cannot be edited or overwritten.
5. Select from the following options:
This field pertains to using a bot to run other bots. See [Task Bot package](#) on page 804.
 - Use as input: The variable holds a value that can be passed from the parent bot to a child bot. (Applicable only to a child bot).
 - Use as output: The variable holds a value that can be passed from a child bot to the parent bot. (Applicable only to a child bot).
 - Both: The value can be passed in both directions.
 - Neither: The variable is confined to this bot; it cannot be shared across other bots.
6. Select a data type from the drop-down list.



Note: After the variable is initialized, you cannot change the type.

For more information on data types, see [Variable types](#) on page 869.

7. Optional: Enter a default value to assign to the variable.
The values are NULL/empty by default.
8. Click Create.
The variable appears in the Variables pane on the left side of the Bot editor.
9. To insert a variable into an action field, perform one of the following actions:
 - Click F2 to open the variables list.
 - Click the Insert a value icon, located on the right side of the field.
 - Enter the variable name. As you type, the field generates suggestions of existing variables.



Note: Add a dollar sign at the start and end of the variable. For example, `$myVariableName$`.

[Build a Go be Great bot](#) on page 886: Follow the steps in this procedure for an example of how to create a variable and assign it to an action.

Type casting

You can temporarily convert the values inside a Boolean, Number, or String variable from one type to another type to use within one action. For example, use `$<YourStringVariable>.String:toNumber$` to convert the value of a string variable to a number variable to perform mathematical operations.

In the text field, enter `$<variable name>..` After you enter the period, the auto-fill suggests possible actions such as `toNumber`.

Variable type	Type casting options
Boolean	- invert: Converts the Boolean value to the opposite value (True to False and False to True). - toNumber: Converts the Boolean value to a numeric value (True to 1 and False to 0). - toString: Converts the Boolean value to a string value.
Number	- decrement: Decreases the number value by one. - increment: Increases the number value by one. - toString: Converts the number value to a string value.
String	- length: Returns the number of characters in the string as a numeric value. - lowercase: Converts the characters in the string to lowercase. - reverse: Reverses the characters in the string. - toBoolean: Converts the string value to a Boolean value. - toNumber: Converts the string value to a number value. The limits of the String to Number action apply here. See String to number action. - trim: Trims blanks and whitespaces from the string. - uppercase: Converts the characters in the string to uppercase.



Note: Type casting is not supported for the following scenarios:

- As a value that is passed between bots.
- As a property value for an object captured with the Universal Recorder.

[Object properties](#) on page 749

Recursive expressions

Use a recursive expression to insert a variable in the place of an index or key of a dictionary, list, record, or table variable.

A recursive expression contains a variable nested inside of another variable (the outer variable). The value of the outer variable is conditional based on the value of the nested variable.

For example, the list variable `$listOfPlanets$` has the following values: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. The Number variable `$indexPosition$` has value of 2. The expression `$listOfPlanets[$indexPosition$]` returns `Earth`.

The following types of expressions are supported. You can create a recursive expression containing up to 10 expressions.

- `$dictionaryVariable{$key}$`
- `$listVariable[$index]$`
- `$recordVariable[$index]$`
- `$tableVariable[$rowIndex][$columnIndexOrName]$`



Note:

- You cannot use a Table variable within a List variable. For example, the following expression is not supported: `$vListStr[$vTable[0][0]]`
- You cannot combine expressions with properties. For example, the following expression is not supported: `$dictionaryVar{$listStrVar[2]$}.String:reverse$`

Record variable

A record variable holds a row of data extracted from a database, spreadsheet, or table in name-field pairs. The fields can store values of Boolean, datetime, number, or string data type.

Working with a record variable

Record variables are commonly used in the loop action to store a single row of retrieved data; you can access a single value by specifying the index number or name. The index number is the position of the name-field pair. The name is either configured when the variable is initialized or it can be extracted from the column headers of the source table.

The following is an example table:

CustomerName	City
Dana	Pittsburgh
Sam	Los Angeles
Alex	Boston

In this example, a bot loops through the preceding table and assigns each row to `rCurrentRow`. To retrieve the value from the first column of each row, use either the index number `$rCurrentRow[0]` or name `$rCurrentRow{CustomerName}$`.



Note: To retrieve a date time value from a record variable and use it as a string, concatenate the record variable with a string value in the action field.

Schema

A schema is like a template for the record fields. It sets the order of the fields and the type of data that can be entered into each field.

If you select the Set schema option when creating a new record variable, the following conditions apply at runtime, where the bot retrieves a row of data and stores it to a record variable:

- The retrieved values must match the configured field data types.

For example, the data set [{"name":"Sally"}, {"id":002}, {"dob":03/05/1989}] can be assigned to a record variable with the schema [{"name":String}, {"id":Number}, {"dob":Date}].

- The data set attributes must follow the same order and capitalization.

For example, the data set [{"name":"Henry"}, {"id":003}, {"dob":06/13/2001}] cannot be assigned to a record variable with the schema [{"id":Number}, {"name":String}, {"dob":Date}] or {"Name":String}, [{"ID":Number}, {"DOB":Date}].

- The record variable can accept a superset of the configured fields if the fields are in the same order.

For example, the data set [{"name":"Alex"}, {"id":004}, {"dob":12/10/1995}, {"pet":"yes"}] can be assigned to a record variable with the schema [{"name":String}, {"id":Number}, {"dob":Date}].

- The record variable does not accept a subset of data.

For example, the data set [{"id":005}, {"dob":05/21/1975}] cannot be assigned to a record variable with the schema [{"name":String}, {"id":Number}, {"dob":Date}].

If the bot encounters a row of data that does not meet the record variable schema, the bot fails. This prevents the bot from passing incorrect or invalid data into the next action.

Unicode range supported in variables

Review the valid characters that can be used in a variable name.

Language	Characters	Range
Arabic		U+0600 - U+0605, U+0620 - U+0669, U+066E - U+06D3
CJK ideographs	Common	U+4E00 - U+9FEA
	Extension A	U+3400 - U+4DB5
	CJK compatibility ideographs	U+F900 - U+FA6D
Chinese	Chinese Kanji	See CJK ideographs
Japanese	Hiragana	U+3041 - U+3096, U+309D, U+309E
	Katakana	U+30A1 - U+30FA, U+30FC
	Kanji	See CJK ideographs
	Double-byte numbers	U+FF10 - U+FF19
Korean	Hangul Syllables	U+AC00 - U+D7A3
Latin	a-z	U+0061 - U+007A
	A-Z	U+0041 - U+005A
Numbers	0-9	U+0030 - U+0039
Russian	Cyrillic	U+0400 - U+0481, U+0483 - U+0487, U+048A - U+04FF
Special characters	Hyphen (-) and underscore (_)	U+002D, U+005F

Use Work Item variables

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

The Work Item variables are available in a TaskBot only after you attach a work item template to the TaskBot when you define the work item template in the work item structure during queue creation.

[Attach work item template to TaskBot](#) on page 861

1. Go to the My bots page.
2. Click Create a bot.
3. In the Create a Taskbot window, enter the required parameters such as Name, Description, and Folder location.
4. Click Create & edit to open the TaskBot in edit mode.
5. Attach the bot to a queue category by selecting a Work item template.

[Attach work item template to TaskBot](#) on page 861

6. Press the function key F2 to open the Insert a variable window and add the following Workload variables to an action:
 - a) `workItem` to view the default values or attributes of the Work Item when you run the TaskBot using the Run bot with queue option.
 The `workItem` is an input variable for debugging a Workload bot to be used for TaskBot deployment options Run now and Schedule a bot. You can add the values for the `workItem` variable when you create an automation.
 On the other hand, when you use the option Run bot with queue, the `workItem` variable uses the values passed on by the Enterprise Control Room.
 - b) `workItemResult` to set the final outcome of the Work Item when you run the TaskBot using the Run bot with queue option.
 Use the String > Assign action to set the value of `workItemResult` variable. This is an output variable type and you can use the string values as well as other variables to set the value of `workItemResult` variables.

The variables are read-only and therefore cannot be edited or deleted from the TaskBot editor page. Double click a variable in the Variables panel to view the variable parameters:

- Variable name.
- Description of the variable.
- Read only if the Constant check box is selected when the variable was created.
- To be used as input or output parameter in a TaskBot during run time.
- Variable type.
- The default values or attributes that are configured with the Work Item template for a `workItem` variable or the default output values for a `workItemResult` variable.

Related concepts

[Workload management](#) on page 1079

The workload management module enables users to upload Microsoft Excel and CSV files to the Enterprise Control Room so that it feeds the records from the files into the bot deployments.

Related tasks

[Define Work Item structure](#) on page 1083

Define the Work Item structure for processing in a queue. This enables you to manually upload the Work Items from the system in the absence of ready data in a file.

[Attach work item template to TaskBot](#) on page 861

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

Related reference

[Workload package](#) on page 831

The Workload package enables you to insert work items in a queue for workload automation. It also enables data chaining between multiple queues. You can orchestrate multiple bots, and enable optimal device utilization through the queueing mechanism of workload management.

Credentials and credential variables in the Bot editor

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

Credential

A credential holds the sensitive information in attributes. An attribute can have a value that is standard for all users or it can accept a user-input value. For example, an `Email` credential can hold three attributes: `host_name` (standard value), `username` (user input), and `password` (user input).

Credentials are predefined in the CREDENTIALS tab and cannot be modified when the user is building or running a bot.

By default, all users can create, manage, and use their own credentials. A user is granted access to another user's credentials by receiving access to a locker that holds the credential. If the credential requires a user-input value, it appears in the CREDENTIAL REQUESTS tab.

A credential must be assigned to a locker to be used for building and running a bot.

Locker

A locker specifies which users can view, modify, or access the credentials. For example, a human resources (HR) locker can hold `Email`, `Database`, and `Training website` credentials and allow only specific employees of the HR department to use the credentials in their bots.

Credential variable

A credential variable stores a credential value in a user-defined variable. It enables users to securely pass values to a bot and from a bot to another bot. Using a credential variable ensures that the values are not displayed in a message box or written to a file. The value is either selected from the Credential Vault or is provided by the user. You can use it into any action field that accepts a variable.



Note: Values of this data type cannot be converted to another data type.

You can:

- Pass login credentials to a child bot.

- Retrieve confidential data, such as account numbers, and pass them to the main bot.



Note: You cannot pass credential values to the main bot when you deploy it from the Run bot now page. The values must be hard-coded in the bot or selected from the Credential Vault.

Working with credentials

- Only fields with a Credential tab below the field name accept a credential.
- Action fields display the locker, credential, and attribute name; users can not see attribute values in the Bot editor.
- A credential cannot be appended to other variables or to a string.

Related tasks

[Create credential](#) on page 1101

Create a credential and add the required attributes.

[Edit a credential](#) on page 1101

Modify credential details and add or remove attributes.

Example of building a bot that uses credentials

Build a bot that securely logs in to an online bank using credentials from Credential Vault, ensuring that the username or password is not stored in the bot or on the device.

- Credentials must be assigned to a locker to be used in a bot.
- You must have Consumer permissions to the locker.

If the email notification setting is enabled, you receive an email that confirms the locker name and your permissions to that locker.

In this example, you configure a credential with user-provided values and build a bot to automate logging into an online bank website.

1. Provide the user-input values.
 - a) Navigate to BOTS > Credentials > CREDENTIAL REQUESTS.
The credentials that require a user-provided value have an incomplete icon in the first column.
 - b) Click the credential that holds the bank login credentials.
 - c) Click Edit.
 - d) Enter the attribute values for the username and password and click Save changes.
2. Open a new bot.
 - a) From Automation Anywhere web interface, select BOTS > My bots.
 - b) Click Create new > Bot.
 - c) Enter a bot name and click Create and edit.
3. Open the browser to the bank login page.
 - a) Double-click or drag the Browser > Launch website action.

- b) Enter the URL.
For example, `www.examplebank.com/login`.
 - c) Select your preferred browser.
 - d) Click Save and Run.
The bank website opens in a new window. If the website opens in a new tab, drag it into a separate window.
4. Specify the username text box.
 - a) Double-click or drag the Recorder > Capture action.
 - b) From the Object detail menu, select the window containing the bank website.
 - c) Click Capture object.
The window containing the bank website is activated.
 - d) Hover over the username text box and click when a red outline appears.
 - e) In the Object properties table, verify that the Control Type is a textbox.
 - f) From the Action menu, select Set text.
 - g) Select the Select a credential option and click Pick to navigate to the credential.
The Pick a credential window appears.
 - h) Select the Locker, Credential, and Attribute for the bank website username and click Confirm.
5. Repeat Step 4 to specify the password text box.
6. Specify the Log on button.
 - a) Double-click or drag the Recorder > Capture action.
 - b) From the Object detail menu, select the window containing the bank website.
 - c) Click Capture object.
The window containing the bank website is activated.
 - d) Hover over the Log on button and click when a red outline appears.
 - e) In the Object properties table, verify that the Control Type is a button.
 - f) From the Action menu, select Click.
7. Close the window containing the bank website.
8. Click Save and Run.

[Example of building a bot that uses credential variables](#) on page 881

Perform the steps in this task to learn how to pass values securely between bots.

Related reference

[Recorder package](#) on page 749

Use the Capture action from the Recorder package to capture an interaction with a user interface (UI) object such as a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, and page tab. The Capture action replaces the Object Cloning command from Version 11.3.

[Credentials and credential variables in the Bot editor](#) on page 878

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

Example of building a bot that uses credential variables

Securely pass values to a bot using credential variables to automate the process of logging in to a bank website.

Complete the steps in the following task to build the child bot that automates logging in to a bank website: [Example of building a bot that uses credentials](#) on page 879

This task is performed by the user who wants to build and deploy bots. You must have the necessary rights and permissions to complete this task, and authorization to log in to the Enterprise Control Room as the licensed user.

In this example, you modify the bot to accept credentials passed from a parent bot.

In the bot that you built for [Example of building a bot that uses credentials](#) on page 879, create two credential variables and insert them into the Recorder > Capture actions.

1. Configure the credential variable to hold the username.

Field	Input
Name	username
Use as input	select
Type	Credential
Default value	Insecure string, leave field empty

2. Configure the credential variable to hold the password.

Field	Input
Name	password
Use as input	select
Type	Credential
Default value	Insecure string, leave field empty

3. Modify the first Recorder > Capture action.

- a) Click the action to open it in the action editor.
- b) In the Select a credential field, select the Variable tab.
- c) Click F2 to open the Variables menu and select \$username\$.
- d) Click Yes, insert.

4. Repeat the substeps in step 3 to insert the \$password\$ variable into the second Recorder > Capture.

5. Click Save and Close
The My bots page appears.

Create a parent bot that will run the child bot and pass it the credential values.

6. Open a new bot.
 - a) Click Create new > Bot.
 - b) Enter a bot name and click Create and edit.
7. Insert a Task Bot > Run action to select the bot and provide the login credentials.

- a) Double-click or drag the Task Bot > Run action.
- b) In the Task Bot to run field, select the Control Room file tab.
- c) Click Browse and select the bot that you modified in the above steps.
- d) In the Input values options, select both Set username and Set password.
- e) For each credential variable, click Pick to select the locker, credential, and attribute.

8. Click Save and Run.

Related tasks

[Create a variable](#) on page 873

Create a variable to store values.

Related reference

[Task Bot package](#) on page 804

Use the Run, Pause, and Stop actions in the Task Bot package to manage running one or more child bots from a parent bot or with a third-party software using an API.

[Credentials and credential variables in the Bot editor](#) on page 878

Use credentials when building bots to pass sensitive information such as passwords and account numbers. Using credentials separates the sensitive information from the bots and Bot Runners, which reduces the risk of data spillage or unauthorized user access.

Global values

Global values enable users to reuse identical values between bots instead of creating new variables for each bot. A user with the **AAE_admin** role configures a global value with a default value and can enable non-admin users to overwrite the value to use in their bots.

Data types

Data type	Description
DateTime	Stores a value containing a single date and time value.
Number	Stores numeric values, including integers and decimals. It can hold up to 15 decimal digits.
String	Stores alphanumeric and character values.

Working with global values

Users can perform the following tasks:

- Create a global value as an admin
[Create a global value](#) on page 883
- Update the default value as a non-admin
[Overwrite the default value](#) on page 883
- Insert global values into bots

All action fields that accept a user-created variable accept a global value. Insert a global value into an action field by pressing F2 or by clicking the Insert a value icon on the left side of the field.

Create a global value

As a user with the `AAE_admin` role, you can create a global value, configure the data type, set the default value, and enable the value to be updated by non-admin users.

1. Navigate to BOTS > Global values.
The All global values page appears with a table of global values.
2. Click Create global value.
3. Enter a descriptive name of up to 50 characters.



Note:

- When the global value is initialized, you cannot change the name.
- Global values cannot be named Java keywords such as String, Boolean, Integer, Public, and Finally.

4. Optional: Enter a description of up to 255 characters.
5. Select the data type from the drop-down list.
[Data types](#) on page 882
6. Enter the default value.



Note: When the value is initialized, you cannot change the type.

7. Specify whether users can overwrite the value:
 - CANNOT be changed: The default value remains constant across all users and bots.
 - CAN be changed: Users can overwrite the default value to use in their bots.
8. Click Create global value.

Overwrite the default value

Global values can be configured to allow non-admin users to overwrite the default value. When building bots, use a global value for values that remain constant across all bots instead of creating a new variable for every bot.

As a non-admin user, you can only overwrite the default value in global values with a changeable scope. You can identify which global values have a changeable scope by checking the value in the Scope changeable column in the All global values table.

To verify if a global value has a changeable scope and to overwrite the default value, do the following steps:

1. Navigate to BOTS > Global values.
The All global values table appears. Each row shows the data type, value name, whether the scope is changeable, and the last modified date and time.
2. Find the global value that has a changeable scope.
3. Move your mouse over the vertical ellipsis and click Edit global value.
The Edit global value page appears with the User value field enabled.
4. Enter the value that will overwrite the default value.



Note: This value will overwrite the default value of this global value in all of your bots.

5. Click Save changes.

Bot dependencies

Bots dependencies are files and other bots that are required to run that bot successfully.

Related tasks

[Upload bot and its dependencies](#) on page 884

You can upload 11.x or 10.x bots, their dependent bots, and other files that are required to run a bot successfully in the Enterprise A2019 Enterprise Control Room.

[View bots dependencies](#) on page 885

You can view the files and bots that are added to a bot as its dependencies.

Related reference

[Bot dependencies](#) on page 884

Bots dependencies are files and other bots that are required to run that bot successfully.

Upload bot and its dependencies

You can upload 11.x or 10.x bots, their dependent bots, and other files that are required to run a bot successfully in the Enterprise A2019 Enterprise Control Room.

1. Click BOTS > My bots.
2. In the PRIVATE tab, expand the Bots folder and select the folder in which you want to upload the dependent files.
3. Click the Upload files icon.
4. On the Upload files page, click Add files.
5. From the Open dialog box, select the files you want to upload and click Open.
6. Click Upload.

Related tasks

[Add bot dependencies](#) on page 884

You must add the files that are required to run a bot as its dependencies.

[View bots dependencies](#) on page 885

You can view the files and bots that are added to a bot as its dependencies.

Add bot dependencies

You must add the files that are required to run a bot as its dependencies.

Ensure that the files you want to add as dependencies are uploaded in the Enterprise Control Room, except for bots.

The system identifies the automatic dependencies for a bot and adds the required files and other bots as its dependencies. However, for manual dependencies, you must identify the files and bots that are required and add them as dependencies for a bot.

1. Click BOTS > My bots.
2. In the PRIVATE tab, expand the Bots folder that contains the bot for which you want to add dependencies.
3. Select the bot for which you want to add dependencies.
4. Select the Edit Task Bot icon from the actions menu (vertical ellipsis) on the right.
5. Select Dependencies from the actions menu (vertical ellipsis) on the top-right.
6. Expand the Bots folder and select the folder that contains the files you want to add as dependencies.

7. Select the files you want to add as dependencies from the Available files section and click the right arrow.
8. Click Save.
9. Click Return to editor if you want to update the bot or click Close to close the bot.

Related tasks

[View bots dependencies](#) on page 885

You can view the files and bots that are added to a bot as its dependencies.

[Upload bot and its dependencies](#) on page 884

You can upload 11.x or 10.x bots, their dependent bots, and other files that are required to run a bot successfully in the Enterprise A2019 Enterprise Control Room.

View bots dependencies

You can view the files and bots that are added to a bot as its dependencies.

1. In the PRIVATE or PUBLIC tab, expand the folder that contains the bot for which you want to view dependencies.
2. Select the bot for which you want to view dependencies.
3. Select the View Task Bot icon from the actions menu (vertical ellipsis) on the right.
4. Select Dependencies from the actions menu (vertical ellipsis) on the top-right.
The system shows a list of files and bots that are added as dependencies for the bot.

Related tasks

[Add bot dependencies](#) on page 884

You must add the files that are required to run a bot as its dependencies.

[Upload bot and its dependencies](#) on page 884

You can upload 11.x or 10.x bots, their dependent bots, and other files that are required to run a bot successfully in the Enterprise A2019 Enterprise Control Room.

Get started building bots

Use the following three examples to become familiar with building bots using in the cloud-based Bot editor. These examples demonstrate using actions and the Universal Recorder to automate tasks in applications and browsers.

[Build a Go be Great bot](#) on page 886

Build a basic bot using a Message Box action and a variable. Follow these steps to create your first bot that prints the message, `Go be great!`, the Automation Anywhere version of `Hello World!`

[Build a basic bot that uses a desktop application](#) on page 887

Build a bot that uses a conditional statement to verify that the calculator is open, then uses the calculator to multiply two numbers. This example uses actions from the Application, If, Simulate keystrokes, Message Box, and Window packages.

[Example of extracting data from a web table](#) on page 888

Build a bot to open a browser window to the NASDAQ website, extract the data from a table, and write it to a CSV file on your desktop. This example uses actions from the Browser, Data Table, Recorder, and Window packages.

For more examples, see [Examples of building bots](#) on page 890.

More resources

- To learn more, search for the Hello A2019 Bot: Getting Started with Building Bots course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).
- You can also visit the [Learn section of the developer portal](#) for more guidance. Find learning journeys and videos for both new and experienced developers on how to build your first bots.

Build a Go be Great bot

Build a basic bot using a Message Box action and a variable. Follow these steps to create your first bot that prints the message, `Go be great!`, the Automation Anywhere version of `Hello World!`

To build a bot you must already have done the following:

- [Install Bot agent and register device](#) on page 400
- [Set user device credentials](#) on page 415

If you have already completed the steps in [Create your first bot](#) on page 418, skip to step 6.

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location `\Bots\`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Insert a [Message box package](#) on page 694 action.
 - a) Click Actions.
 - b) Search for the Message Box package.
Click in the Actions search box and type the word, `message`. Click the arrow to expand the Message Box options.
 - c) Double-click or drag the Message Box action to the Bot editor (open space to the right).
A dialog box to configure the action opens.
3. Specify the conditions for the Message Box action.
 - a) In the Enter the message box window title field, type `My first bot!`.
 - b) In the Enter the message to display field, type `Go be great!`.
 - c) Accept the defaults in the Scrollbar after lines field and Close message box after check box.
4. Click Save.
Your bot is now ready to run.
5. Test your bot.
Click Run at the top right.
The bot generates a pop-up Message box with the text `Go be great!`.

In the following steps, you configure a variable and insert it into the Message box.

6. Create a variable.
 - a) Click Variables.
The Variables accordion menu is located below the Actions menu.
 - b) Click the Create variable icon.
 - c) Enter `vHelloWorld` in the name field.
 - d) Check the Use as output option.
 - e) Type `Say Go be Great! with a variable` in the Default value field.
 - f) Click Create.
7. Assign the `vHelloWorld` variable to the Enter the message to display field.
 - a) Click the Message Box action icon.
A dialog box to configure the action opens.
 - b) Delete the text from the Enter the message to display field.
 - c) Either press the F2 key or click the Insert variable icon.
The Insert variable icon is located on the right side of the text field.
 - d) Select `vHelloWorld` from the drop-down list.
 - e) Click Yes, insert.
8. Click Save.
9. Click the Run icon.
The bot generates a pop-up Message box with the text `Say Go be Great! with a variable`.

After you successfully run your bot, progress to [Build a basic bot that uses a desktop application](#) on page 887.

Build a basic bot that uses a desktop application

Build a bot that uses a conditional statement to verify that the calculator is open, then uses the calculator to multiply two numbers. This example uses actions from the Application, If, Simulate keystrokes, Message Box, and Window packages.

To build a bot you must already have done the following:

- [Install Bot agent and register device](#) on page 400
- [Set user device credentials](#) on page 415

1. Open a new bot.
 - a) From Automation Anywhere web interface, select BOTS > My bots.
 - b) Click Create new > Bot.
 - c) Enter a bot name and click Create and edit.
2. Insert an conditional sequence that verifies that the calculator is open and activates the window.
 - a) Double-click or drag the If action.
 - b) Select Window exists from the Condition drop-down list.
 - c) Select Calculator from the Window drop-down list.
The Calculator window is saved to the variable `window-1`.

- d) Drag the Message box action into the If container.
 - e) In the Enter the message to display field, enter `The calculator is running`.
 - f) Drag the Window > Activate action into the If container below the Message box action.
 - g) In the Window field, insert the `window-1` variable.
3. Insert an alternative sequence that opens the calculator.
 - a) Double-click the If > Else action.
 - b) Drag the Message box action into the Else container.
 - c) In the Enter the message to display field, enter `The calculator is not running`.
 - d) Drag the Application > Open program/file action into the If container below the Message box action.
 - e) In the Location of the program/file field, enter `C:\Windows\System32\calc.exe`.
 4. Insert the Simulate keystrokes action to perform the calculation.
 - a) Drag the Simulate keystrokes action below the If and Else containers.
 - b) In the Window field, insert the `window-1` variable.
 - c) In the Keystrokes field, enter `5*5=`.
 - d) In the Delay field, enter `500`.
 5. Click Save to save the bot.
 6. Run the bot.
When the bot runs, the `The calculator is not running` message appears, then the Calculator window opens, and the calculation is performed.
 7. Run the bot again.
When the bot runs, the `The calculator is running` message appears, then the Calculator window activates, and the calculation is performed.

If the bot does not input all of the numbers into the calculator, try increasing the keystrokes delay.

Example of extracting data from a web table

Build a bot to open a browser window to the NASDAQ website, extract the data from a table, and write it to a CSV file on your desktop. This example uses actions from the Browser, Data Table, Recorder, and Window packages.

To extract data from a table, do the following steps:

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location `\Bots\`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Open a browser window to the web page from which you will extract the table.

- a) Double-click or drag the Browser > Launch website action.
- b) In the URL field, enter `https://old.nasdaq.com/`.
- c) Specify the Internet Explorer browser.



Note: It is recommended to use Internet Explorer because it reliably launches the website in a new window, even if there is already an open window. Other browsers might launch the website in a new tab if there is an open window.

- d) Click Save.
 - e) Click Run.
- The bot opens the window.

3. Specify the table.

- a) Double-click or drag the Recorder > Capture action.
- b) Click the Window tab and select the Daily Stock Market Overview window from the drop-down list.
If the window title does not appear in the list, click Refresh.
- c) Click Capture object.
The Daily Stock Market Overview window activates.
- d) Hover over the table below the Stock Market Overview heading.
An orange box appears, surrounding the table.
- e) Click the table.
The Object Processing message box appears.
- f) Return to the Enterprise Control Room.
- g) In the Object properties table, verify the Control Type is TABLE.
If it is not, click Recapture object.
- h) From the Action drop-down list, select Get table.
- i) In the Assign output to variable field, create the `tNasdaqTable`.

The Daily Stock Market Overview window is saved as the variable `window-1`.

4. Specify the file where to save the data.

- a) Double-click or drag the Data Table > Write to file action.
- b) From the Data table name list, select `tNasdaqTable`.
- c) Provide a file path to create a CSV file.
For example, `C:\Users\<username>\Desktop\NasdaqTable.csv`.
- d) Select the Create folders/files if it doesn't exist option.
- e) Select to overwrite the existing file.

5. Close the Daily Stock Market Overview window.

- a) Double-click or drag the Window > Close action.
- b) Select the Variable tab and insert `window-1`.

6. Click Save.

7. Click Run.

The bot creates a CSV file on the desktop with data on seven indexes, their values, and net change.

Examples of building bots

Use these example tasks to become familiar with the features and learn to build bots in Enterprise A2019.

Example of entering data into a web form from a worksheet

In this example, you build a bot to enter multiple rows of data from an XLSX sheet into a web form. Use actions from the Excel advanced, Loop, and Recorder packages.

To retrieve values from an Excel file and input them into a web form, do the following:

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Open the Excel file.
 - a) Double-click or drag the Excel advanced > Open action.
 - b) Enter a session name.
 - c) Select the Excel file.
 - d) Mark the Sheet contains a header option.

By marking the Sheet contains a header option, you enable the bot to search for the column by the header name during run time.

3. Launch the website.
 - a) Double-click or drag the Browser > Launch website action.
 - b) Enter the website URL.
4. Retrieve the worksheet values and store them in a Table variable.
 - a) Double-click or drag the Excel advanced > Get multiple cells action.
 - b) Enter the same session name you used in the Excel advanced > Open action.
 - c) Select All rows from the drop-down list.
 - d) Create a Table variable using the icon to the right of the Assign to variable drop-down list.
5. Instruct the bot to process the data row by row.
 - a) Double-click or drag the Loop action.
 - b) Select the For each row in table iterator.
 - c) Select the same Table variable that you used in Get multiple cells.

- d) Create a Record variable using the icon to the right of the Assign to variable drop-down list.

The Record variable holds all of the values for one row. With each iteration of the Loop, the bot retrieves the values of the next row and stores them in the Record variable, overwriting the values from the previous row.

6. Map the first column header to the web form textbox.
 - a) Double-click or drag the Recorder > Capture action.
 - b) Select the same window you opened with the Launch website action.
 - c) Click Capture object.
 - d) Hover over the textbox until a red outline appears.
 - e) Click the textbox.
 - f) Return to the Enterprise Control Room.
 - g) Verify that the Control Type value is TEXTBOX.
 - h) Select Set text from the Action drop-down list.
 - i) In the Keystrokes field, insert the same Record variable that you used in the Loop.
 - j) Select the By name option and copy-paste the first column header into the field.
7. Repeat the sub-steps in step 5 to map the other columns, with the following differences:
 - a) Instead of searching for the browser window title, insert the Window variable generated by the Recorder.
 - b) When inserting the Record variable in the Keystrokes field, copy-paste the subsequent column header into the "By name" field.
8. Capture the Submit button.
 - a) Double-click or drag the Recorder > Capture action.
 - b) Insert the Window variable generated by the Recorder.
 - c) Click Capture object.
 - d) Verify that the Control Type value is BUTTON.
 - e) Select the Click action.
9. Click Save.

Related reference

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

[Recorder package](#) on page 749

Use the Capture action from the Recorder package to capture an interaction with a user interface (UI) object such as a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, and page tab. The Capture action replaces the Object Cloning command from Version 11.3.

Example of using a conditional statement

In this example, you build a bot that prints a message based on whether a cell has a value or is empty. Use the actions from the Excel basic or Excel advanced, If, and Message Box packages.

Before building this bot, save an empty Excel worksheet to the desktop.

Because this bot does not create a new Excel worksheet, you can use either the Excel basic or Excel advanced packages.



Note: All of the actions must be from the same package.

1. Open a new bot.
 - a) From Automation Anywhere web interface, select BOTS > My bots.
 - b) Click Create new > Bot.
 - c) Enter a bot name and click Create and edit.
2. Use the Open action from the Excel basic or the Excel advanced package to open the Excel sheet.
 - a) Double-click or drag the Open action.
 - b) Enter a session name.
 - c) Click Browse to provide the file path to the empty Excel worksheet on the desktop.
3. Use the Get single cell action to assign the value of a cell to a string variable.
 - a) Double-click or drag the Get single cell action from the same package that you used for the Open action.
 - b) Provide the session name that you used in the Open action.
 - c) Select the Active cell option.
 - d) In the Store cell contents to field, create the variable `Output`.
4. Use the If action to configure the conditional statement.
 - a) Double-click or drag the If action.
 - b) Select String from the Condition drop-down list.
 - c) In the Source value field, insert the variable `Output`.
 - d) Select Equals to as the Operator.
 - e) Leave the Target value field empty.
5. Insert a Message box into the If container.
 - a) Drag the Message box action.
 - b) In the Enter the message to display field, enter `Cell is empty`.
6. Use the Else and Message box actions to configure the alternative sequence of actions.
 - a) Drag the Else action next to the If action.
 - b) Drag the Message box action into the Else container.

- c) In the Enter the message to display field, enter `Cell is not empty`.
- 7. Click Save.
- 8. Run the bot.
As the bot runs, the message box appears with the message `Cell is empty`.
- 9. Enter a value into the cell located at A1 in the Excel sheet and save the sheet.
- 10. Run the bot.
As the bot runs, the message box appears with the message `Cell is not empty`.

Related reference

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

[If package](#) on page 656

Use the actions in the If package to control the sequence of execution based on one or more conditions of a task.

[Message box package](#) on page 694

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: `Web Form Filled and Complete`.

Example of using Python script to join a list

Build a bot that uses a Python function to print the message `Go Be Great!`, the Automation Anywhere Enterprise version of `Hello World`. In this example, the bot combines a list of string values and prints them to a message box.

To run Python script from Enterprise A2019, you must already have the latest version of Python 3.x installed on your device.

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location `\Bots\`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Create a variable to hold the list values:
 - a) Click the Create variable icon.
 - b) Enter `1Argument` in the Name field.



Recommendation: Prefix the variable name with a lowercase character to indicate the variable data type.

[Variable naming](#) on page 869

- c) Select the List type and String subtype.
- d) In the Default value field, enter the following values:

1. Value at 0: Go
 2. Value at 1: Be
 3. Value at 2: Great
 4. Value at 3: !
- e) Click Create.
3. Provide the script with a Python Script > Open action:
 - a) Double-click or drag the Python Script > Open.
 - b) Select the Manual input option.
 - c) Copy and paste the following text into the Enter script here field.

```
def data ( str ) :
    x = " ".join( str )
    return x
```
 4. Use a Python Script > Execute function action to tell the bot to run the script:
 - a) Double-click or drag Python Script > Execute function.
 - b) Enter data in the Enter name of function to be executed field.
 - c) Select the lArgument variable from the Arguments to the function drop-down list.
 - d) Create the variable sOutput for the Assign the output to variable field.
 5. Insert a Message box action to hold the Python function output:
 - a) Double-click or drag the Message box > Message box action.
 - b) In the Enter the message to display field, select and insert the variable sOutput.
 - c) Select the Close message box after option. Retain the default value of 5 seconds in the field.
 6. Close the script execution session with a Python Script > Close action:
 - a) Double-click or drag Python Script > Close.
 - b) Click Save.
 7. Click the Run icon.
 The bot generates a message box with the text Go Be Great!. After 5 seconds, the message box disappears.

 To review the bot launcher logs, navigate to C:\ProgramData\AutomationAnywhere\BotRunner\Logs\<current month>\Bot_Launcher-<today's date>.log.zip. Each zipped folder contains a file with data on the code execution, which is useful for debugging.

Related reference

[Python Script package](#) on page 745

The Python Script package contains actions that enable Python Script functions in a task.

[Message box package](#) on page 694

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: **Web Form Filled and Complete**.

Example of transferring data from CSV file to Excel worksheet

In this example, you build a bot to update the product inventory in an Excel worksheet with new product names from a CSV file. Use actions from the CSV/TXT, Excel advanced, IF/ELSE, and Loop packages.

Before you start building the bot, create the following data sets on your desktop in the specified file formats:

Data set 1: ProductInventory.xlsx

Item number	Name	Count	Category	Unit price	Taxable
A0001	Milk	15	Grocery	3	N
A0002	Eggs	6	Grocery	4	N
A0003	Flower	3	Garden	10	Y
A0004	Table	1	Home	50	Y
A0005	Towel	4	Home	10	Y
A0006	Dog Food	16	Pet	22	N
A0007	Paint	43	Home	12	Y

Data set 2: NewProductNames.csv

Item number	Name
A0005	Hand Towel
A0002	Chicken Eggs
A0003	Sunflower
A0004	Coffee Table
A0006	Dog Food - Small Dogs
A0007	Paint - Dark Blue
A0001	2% Milk

- Open a new bot:
 - From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - Click Create TaskBot.
 - Enter a bot name.
 - Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - Click Create and Edit.
- Open the `NewProductNames.csv` file that you just created.
 - Double-click or drag the CSV/TXT > Open action.

- b) In the Session name field, enter `session 1`.
 - c) Provide the file path to `NewProductNames.csv`.
 - d) Select the Contains header option.
3. Open the `ProductInventory.xlsx` file that you just created.
 - a) Double-click or drag the Excel advanced > Open action.
 - b) In the Session name field, enter `session 1`.
 - c) Provide the file path to `ProductInventory.xlsx`.
 - d) Choose to open the file in Read-write mode.
 - e) Select the Contains header option.
4. Use the Go to cell action to indicate the first cell in which to update the product names.
 - a) Double-click or drag the Excel advanced > Go to cell action.
 - b) In the Session name field, enter `session 1`.
 - c) Select the Specific cell option and enter `B2`.
5. Use a Loop action to retrieve the cell values in each row from `ProductInventory.xlsx`.
 - a) Double-click or drag the Loop action.
 - b) Select the Excel Advanced > For each row in worksheet iterator.
 - c) In the Session name field, enter `session 1`.
 - d) In the Loop through field, select All rows.
 - e) In the Assign current value to this variable field, create a `rInventory` variable.
6. Use a Loop action to retrieve the cell values in each row from `NewProductNames.csv`.
 - a) Drag the Loop action into the For each row in worksheet Loop container.
 - b) Select the For each row in CSV/TXT iterator.
 - c) In the Session name field, enter `session 1`.
 - d) In the Assign current value to this variable field, create a `rNewProduct` variable.
7. Use an If action to compare the item number from `ProductInventory.xlsx` to the item number from `NewProductNames.csv` to ensure they are the same before moving on to the next action.
 - a) Double-click or drag the If action into the For each row in csv/txt Loop container.
 - b) Select the String condition.
 - c) In the Source value field, input `rInventory[0]`.
 - d) Select the Equals to (=) operator.
 - e) In the Target value field, input `rNewProduct[0]`.
8. Use the Set cell and Go to cell actions to update the product name and move to the cell below.
 - a) Double-click or drag the Excel Advanced > Set cell action.
 - b) In the Session name field, enter `session 1`.
 - c) Select the Active cell option.
 - d) In the Cell value field, input `rNewProduct{Name}`

- e) Double-click or drag the Excel Advanced > Go to cell action.
 - f) In the Session name field, enter `session 1`.
 - g) From the Active cell drop-down list, select One cell below.
9. Insert an alternative to the If action: if the item numbers are not the same, the bot continues to the next row in `NewProductNames.csv`.
- a) Drag the If > Else action.
 - b) Drag the Loop > Continue action.
10. Close the files.
- a) Double-click or drag the Excel advanced > Close action.
 - b) In the Session name field, enter `session 1`.
 - c) Select the Save changes option.
 - d) Double-click or drag the CSV/TXT > Close action.
 - e) In the Session name field, enter `session 1`.
11. Click Save.
12. Run the bot.

The bot updates the `ProductInventory.xlsx` file to look like the following table:

Data set 3: ProductInventory.xlsx

Item number	Name	Count	Category	Unit price	Taxable
A0001	2% Milk	15	Grocery	3	N
A0002	Chicken Eggs	6	Grocery	4	N
A0003	Sunflower	3	Garden	10	Y
A0004	Coffee Table	1	Home	50	Y
A0005	Hand Towel	4	Home	10	Y
A0006	Dog Food - Small Dogs	16	Pet	22	N
A0007	Paint - Dark Blue	43	Home	12	Y

Related reference

[CSV/TXT package](#) on page 547

The CSV/TXT package contains actions that enable you to open a CSV or text file, read data from that file, and assign the data to a Table variable. This package supports files encoded in ANSI, Unicode, UTF-8, or Windows-1251, and can process up to one million records.

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

[If package](#) on page 656

Use the actions in the If package to control the sequence of execution based on one or more conditions of a task.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

Run TaskBot to merge Excel sheets

Download and run sample TaskBot from the Bot Store to merge two spreadsheets.

Complete these requirements for using the example [TaskBot](#):

- Microsoft Excel must reside on the Bot Runner device
- Enterprise A2019 Build 4088 or later
- Excel Advanced package version 2.0.0-20200422-000103 or later
- Two spreadsheets as input: Both sheets must have common data within column A, such as a product or customer number

You can manually create the spreadsheets with columns similar to the following tables 1 and 2. Sheet 1 has columns to append to sheet 2 where a common value resides in column A. The bot expects the file locations and names to be `c:\bot_test\Spreadsheet1.xlsx` and `c:\bot_test\Spreadsheet2.xlsx`.

Table 1

Item Number	Name	Count	Category	Unit Price	Taxable	Backorder	Perishable	Locale
A0001	Milk	15	Grocery	3	N	Y	Y	US
A0005	Towel	4	Home	10	Y	N	N	US
A0006	Dog Food	16	Pet	22	N	N	N	US
A0007	Paint	43	Home	12	Y	N	N	IN

Table 2

Item Number	Name	Brand	Popular	Unit Price	TTS
A0001	Milk	Wholesome Foods	Y	3	1
A0002	Eggs	Dairy Love	Y	4	1
A0003	Flower	Spring Me Up!	N	10	3
A0004	Table	Woods Are Us	N	50	10
A0005	Towel	Claire Dane	N	10	6
A0006	Dog Food	Purina	Y	22	3
A0007	Paint	Color the World	N	12	2

1. Get the A2019 - Merge Excel Sheets Example bot from the Bot Store.
The bot is automatically loaded to your Enterprise A2019 On-Premises or Cloud environment.

You will receive an email with instructions for installing the bot in Enterprise A2019 from the Bot Store.

2. Follow the instructions carefully. If you do not have the Bot Developer role assigned, contact your administrator to add the role.
3. If your spreadsheets are not located at `c:\bot_test\Spreadsheet1.xlsx` and `c:\bot_test\Spreadsheet2.xlsx`, update lines 5 and 9 of the bot with your desktop file location.

4. Run the TaskBot.

5. Update the TaskBot with any changes that reflect your use case, and make it your own.

You can also use the bot as a template for future Excel Advanced TaskBots by copying and saving it with a new name.

Related reference

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

Example of migrating data from Excel to a database

In this example, you build a bot to transfer values from an Excel spreadsheet to a database using actions from the Database, Excel advanced, and Loop packages.

Before you start building your bot, create the following:

- Excel spreadsheet with the following values:

John	Williams	jwilliams@gmail.com
Sam	Li	sam.li@xyz.org
Carl	Miller	carl@carlmillerllc.com

- Access database table named CustomerT with the following columns:

- FirstName
- LastName
- Email

To migrate values from a spreadsheet to a table in a database, perform the following steps:

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Open the spreadsheet:
 - a) Double-click or drag the Excel advanced > Open action .
 - b) Click Browse to provide the file path.
 - c) Select the option to open the file in Read-write.

3. Connect to the database:
 - a) Double-click or drag the Database > Connect action.
 - b) Select the User defined connection mode.
 - c) Select the Microsoft Access database type.
 - d) Click Browse to provide the file path.
4. Insert the Excel values into the database, row by row:
 - a) Double-click or drag the Loop action.
 - b) Select the Excel advanced > For each row in worksheet iterator.
 - c) In the Assign the current value to this variable, create the record variable `rExcelCurrentRow`.
 - d) Drag the Database > Insert/Update/Delete action into the Loop container.
 - e) Enter the following SQL statement:

```
INSERT INTO CustomerT (FirstName,LastName,Email) values
('$rExcelCurrentRow[0]$', '$rExcelCurrentRow[1]$', '$rExcelCurrentRow[2]$$$');
```

5. Disconnect from the database. Drag the Database > Disconnect action below the Loop container.
6. Close the spreadsheet. Double-click or drag Excel advanced > Close Spreadsheet action.
7. Click Save.

Related reference

[Database package](#) on page 557

Databases support internal operations of an enterprise by storing a variety of data, such as sales transactions, product catalogs, inventories, and customer profiles. Use the Database package to connect to a database, begin a transaction, and manipulate the stored data by retrieving, inserting, updating, deleting, and exporting it to a CSV file.

[Excel advanced package](#) on page 605

The Excel advanced package contains actions that enable you to automate many of the repetitive tasks when working with Microsoft Excel spreadsheets.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

Example of using the Run action

The Run action from the TaskBot package enables you to run and pass values to one or more child bots. In this example, you use the Run action to pass two values from a parent bot to the child bot; the child bot adds the values and passes the sum back to the parent bot.

This example demonstrates the following:

Modularization

Modularization separates a TaskBot into several bots, where each bot is built with all the actions necessary to perform one specific function of the greater task.

In this example, you build a single child bot to add the values. You can build several child bots, with each performing a different mathematical

Reusability

operation, and edit the parent bot to call whichever one you want to use.

Reusability enables the user to build a bot once, and then use that bot to automate many processes.

The child bot contains only the actions necessary to add the values and print them to a Message Box. Also, the bot adds two variables instead of hard-coded values. As a result, this bot can be reused for any task that involves an addition operation.

Data control

Because the child bot accepts and returns values only through the use of variables, it does not hold data. This minimizes the chance of data leakage.

To run a TaskBot from the current task, perform these steps:

Build the child bot.

1. Open a new bot.
 - a) From Automation Anywhere web interface, select Bots > My bots.
 - b) Click Create a bot.
 - c) Enter the bot name AddChildBot.
 - d) Enter the folder location \Bots\TaskBotExample.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Create the following variables:
 - v1: number type; use as input
 - v2: number type; use as input
 - nSum: number type
 - sSum: string type; use as output

[Create a variable](#) on page 873
3. Use a Number > Assign action to perform the mathematical operation.
 - a) Double-click or drag the Number > Assign action.
 - b) In the Select the source string variable/ value field, enter the following expression: \$v1\$ + \$v2\$
 - c) Select nSum from the Select destination number variable list.
4. Use the Number > To string action to convert the value so it can be printed to a Message Box.
 - a) Double-click or drag the Number > To string action.
 - b) In the Enter a number field, enter the following expression: \$nSum\$
 - c) Select sSum from the Assign output to variable list.

5. Click Save.

6. Click Close.

Build the parent bot.

7. Open a new bot.
 - a) From the web interface, select Bots > My bots.

- b) Click Create a bot.
 - c) Enter the bot name `MathBot`.
 - d) Enter the folder location `\Bots\TaskBotExample`.
To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
8. Create a Dictionary variable of Any subtype named `dSums` to accept the values passed from the child bot.
Use the Any subtype to enable the parent bot to accept String, Number, or Boolean type values.
9. Insert a Task Bot > Run action to specify the values for the mathematical operation and the output variable to hold the sum.
 - a) Double-click or drag the Task Bot > Run action.
 - b) Click Browse to navigate to `Bots\TaskBotExample\AddChildBot`.
 - c) Enter the following values in the Input values fields:
 - `v1: 12`
 - `v2: 54`
 - d) Select `dSums` from the Assign output to variable list.



Note: Use a Dictionary variable to hold the output of the Run action in order to make the parent bot more versatile. This way a parent bot can handle different child bots regardless of whether they return a single value or several values.

10. Use a Message Box to retrieve and print the sum.
The variable `sSum` retrieved from the child bot is a key in the Dictionary variable `dSums`.



Note: You must know the variable names from the child bot to extract them from the parent bot. The interface does not automatically import the variable names to the parent bot.

- a) Double-click or drag the Message box action.
 - b) Enter `$dSums{sSum}$` in the Message to display field.
11. Click Save.
12. Click Run.
The bot runs and the Message Box appears containing the sum 66.

Related reference

[Task Bot package](#) on page 804

Use the Run, Pause, and Stop actions in the Task Bot package to manage running one or more child bots from a parent bot or with a third-party software using an API.

[Message box package](#) on page 694

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: **Web Form Filled and Complete**.

Example of using the SOAP web service action

Use the SOAP web service action to pass two numeric values and return the sum from an online calculator application.

To make a SOAP web services call, perform these steps:

1. Double-click or drag the SOAP web services action.
2. Select a connection method:
 - To connect using a URI, enter the URI. For example, `http://www.dneonline.com/calculator.asmx?WSDL`.
 - To connect using a file, select a file from the Control Room or the Desktop, or insert a variable.
3. Optional: Enter the SOAP endpoint in the Address location field.
4. In the Service field, enter the service name.
This field identifies the collection of ports supported by the web service. It holds the `@service` name value for an a SOAP web service call.
For example, `Calculator`
5. In the Port field, enter the endpoint to connect with.
This field holds the `@binding` name value for a SOAP web service call.
For example, `CalculatorSoap`
6. Select the SOAP version of the endpoint that you specified in the Port field.
Choose from 1.1 or 1.2.
7. In the Operation field, enter the name of the service function for the endpoint that you specified in the Port field. .
This field holds the `@operation` name value for a SOAP web service call.
For example, `Add`
8. Select either the Operation parameters or Raw data parameters option to provide the parameter details.
 - If you select Operation parameters, enter the name and value of each parameter. For example, enter these values:
 - a. `intA` in the first Name field.
 - b. `10` in the first Value field.
 - c. `intB` in the second Name field.
 - d. `20` in the second Value field.
 - If you select Raw data parameters, enter the XML value.
9. Select either the No Authentication or Basic option from the Authentication Mode list.
 - If you select No Authentication, proceed to the next step.
 - If you select Basic, enter your credentials.
10. Optional: Provide a Client certificate by selecting a file from the Control Room or your desktop, or insert a variable.
11. Optional: Provide custom headers.

12. Optional: Provide a file to save the XML output.
13. Select either the Complete response or Selected response option to narrow the response scope.
 - If you select Complete response, proceed to the next step.
 - If you select Selected response, perform the following steps:
 - a. Provide the XPath expression.

For example:

```
/*[local-name()='Envelope' and namespace-uri()='http://
schemas.xmlsoap.org/soap/envelope/']
/*[local-name()='Body' and namespace-uri()='http://
schemas.xmlsoap.org/soap/envelope/']
/*[local-name()='AddResponse' and namespace-uri()='http://
tempuri.org/']
/*[local-name()='AddResult' and namespace-uri()='http://
tempuri.org/']
```

- b. Select a section of the XML output: Values, Inner XML, or Outer XML.
 - c. If you select Values, choose a delimiter option: Pipe or Semicolon.
14. Select a variable to store the XML output.

For example, prompt-assignment
15. Verify the output of the SOAP web service action by inserting a Message box action with the variable prompt-assignment in the body message.

When you run the bot, the Message box should show 30.

Related reference

[SOAP Web Service package](#) on page 793

Use the SOAP web service action from the SOAP Web Service package to access and exchange information between two systems in XML format.

Build a Bot Insight dashboard bot

In this example, you build a bot that retrieves data from a website to create visualizations in Bot Insight.

Configure an empty string variable named `sNull`.

[Create a variable](#) on page 873

1. Open a new bot:
 - a) From the Automation Anywhere Enterprise web interface, select Bots > My bots.
 - b) Click Create TaskBot.
 - c) Enter a bot name.
 - d) Accept the default folder location \Bots\.
 - To change where your bot is stored, click Choose and follow the prompts.
 - e) Click Create and Edit.
2. Open a browser window to the web page from which you want to extract the table.
 - a) Double-click or drag the Browser > Launch website action.
 - b) In the URL field, enter `https://www.statista.com/statistics/183483/ranking-of-languages-spoken-at-home-in-the-us-in-2008/`.

- c) Select the Internet Explorer browser.



Recommended: Use Microsoft Internet Explorer because it reliably launches the website in a new window, even if another window is already open. Other browsers might launch the website in a new tab if there is an open window.

- d) Click Save.
 - e) Click Run.
- The bot opens the window.

3. Select the table for extraction.

- a) Double-click or drag the Recorder > Capture action.
- b) Click the Window tab and select the Languages spoken in the United States 2018 | Statista window from the drop-down list.
If the window title does not appear in the list, click Refresh.
- c) Click Capture object.
The Languages spoken in the United States 2018 | Statista window is activated.
- d) Hover over the table until an orange box that surrounds the entire table appears.
- e) Click the table.
- f) Return to the Enterprise Control Room.
- g) In the Object properties table, verify the Control Type is TABLE.
If it is not, click Recapture object.
- h) From the Action drop-down list, select Get table.
- i) In the Assign output to variable field, create the `tLanguages` table variable.

4. Specify the file in which to save the data.

- a) Double-click or drag the Data Table > Write to file action.
- b) From the Data table name list, select `tLanguages`.
- c) Provide a file path to create a CSV file.
For example, `C:\Users\<username>\Desktop\LanguagesTable.csv`.
- d) Select the Create folders/files if it doesn't exist option.
- e) Select to overwrite the existing file.

5. Specify the file that holds the extracted data.

- a) Double-click or drag the CSV/TXT > Open action.
- b) Provide the file path to the file specified in step 4.
- c) Select the Contains header option to exclude the first row.

6. Iterate though each row of the file.

- a) Double-click or drag the Loop action.
- b) Select the For each row in CSV/TXT iterator.
- c) In the Assign the current row to this variable field, create the variable `rCurrentRow`.

7. Specify the data to populate the Bot Insight dashboard.

- a) Double-click or drag the Analyze > Open action.

- b) Double-click or drag the String > Assign action.
- c) Enter `$rCurrentRow[0]` as the source string.
Press F2 to open the variables menu.
- d) In the Select destination string variable field, create the variable `sLanguage`.
- e) Double-click or drag the String > Replace action.
The extracted data uses commas to separate digits. You must remove the commas before you can convert the string to a number data type to use in Bot Insight.
- f) Enter `$rCurrentRow[1]` as the source string.
Press F2 to open the variables menu.
- g) Enter `,` in the Find string field.
- h) Select the Not a regular expression option.
- i) In the Replace with field, enter `$sNull$`.
- j) In the Assign the output row to variable field, create the variable `sPopulation`.
- k) Double-click or drag the String > To number action.
- l) Enter the `$sPopulation$` variable.
- m) In the Assign the output row to variable field, create the variable `nPopulation`.
- n) Double-click or drag the Analyze > Close action.
- o) Select the following variables:
 - `sLanguage`
 - `nPopulation`

8. Click Save and then Run.

9. Click Analyze.

The Bot Insight window appears.

Learn more about dashboards.

[Bot Insight dashboards](#) on page 1318

Related reference

[Analyze package](#) on page 532

Use the actions in the Analyze package to specify the actions and variables to use in the Bot Insight dashboard and widgets. The Analyze package enables you to perform transactional analytics for the data that is logged by the variables when the bot runs.

[Browser package](#) on page 540

The Browser package contains actions that enable you to download files, find broken links, and launch a website. This package supports Internet Explorer, Microsoft Edge, and Google Chrome browsers.

[Recorder package](#) on page 749

Use the Capture action from the Recorder package to capture an interaction with a user interface (UI) object such as a text box, button, table, menu, radio button, combo box, check box, list view, link, tree, and page tab. The Capture action replaces the Object Cloning command from Version 11.3.

[Data Table package](#) on page 549

The Data Table package contains actions that enable you to perform various operations on the values of table variables. Use these actions to join or merge content, search for specific values, insert rows and columns, remove duplicate rows, and write values to a file.

[CSV/TXT package](#) on page 547

The CSV/TXT package contains actions that enable you to open a CSV or text file, read data from that file, and assign the data to a Table variable. This package supports files encoded in ANSI, Unicode, UTF-8, or Windows-1251, and can process up to one million records.

[Loop package](#) on page 687

Use the Loop package to run a sequence of actions repeatedly for a specific number of times or until a specific condition is met.

Get started with Automation Anywhere Robotic Interface

Automation Anywhere Robotic Interface (AARI) enables close collaboration between humans and bots to create new bot creation experience.

Overview

AARI enables users to design a process workflow to address their business requirements. These processes are created in a process editor that incorporates human and bot tasks. The process requires forms, a component to enable human and bot interactions, to define parameters, and render supported UI elements to the web interface.

In the web interface, creators with the AARI user license can create a request to use a process workflow for process instances (case) and run their tasks. Users with the admin role can view any checked-in public processes and assign managers to teams. Users with the manager role can view their assigned processes and manage other creators or teams.

Accessing AARI

The Enterprise Control Room administrator assigns the AARI user license to enable users to access AARI on the web and perform case and task management activities. Managers and creators require this license.

[Enterprise A2019 licenses](#) on page 392

Assigning administrator, manager, and user roles

The Enterprise Control Room administrator assigns the following roles to the users:

Administrator

Provides users the rights to view all processes, managers, users, and teams. They can perform the following operations:

- Global team management: View teams and assigned users, edit team's names and descriptions, and add processes, managers and users to a team. However, they cannot create a team.
- Global process management: View checked-in public processes and assigned managers and teams, edit process tags, and assign managers and teams. However, they cannot create a process.

Manager

- Global case management: View process requests and tasks. However, they cannot create a request or submit a task.

Provides users the rights to become a team owner. The team owner can perform the following operations:

- Team management: Create and view teams, edit team's names, descriptions and process tags, and add teams, team members, and assigned processes.
- Case management: Create and view requests from processes that are assigned to the team and also processes that are assigned to themselves but not to the team.
- Task management: Submit and view tasks from processes that are assigned to the team.

User

Allows creators to access the process editor to create bots, forms, and process requests. The creator can perform the following operations:

- Case management: Create and view requests from processes that are assigned to the team.
- Task management: Submit and view tasks from processes that are assigned to the team.

[System roles](#) on page 1122

Create users for Automation Anywhere Robotic Interface

Create the Automation Anywhere Robotic Interface (AARI) admin, manager, and users to use the AARI functionality for business processes. The Enterprise Control Room admin creates users and assigns the required system roles.

Ensure that you have purchased the AARI user license for your business users.



Note: These roles are only applicable for the web interface.

1. From your local machine, log in to your Enterprise Control Room as administrator.
2. Go to Administration > Users.
3. Click Create user.

The icon is located at the top-right of the Users table.

The Create user page is displayed.

4. In the General Details section, enter the following user details:

Enable User

Select the check box so that the user can log in immediately.

Username

Enter a unique user name.

Description

Optional: Enter a description for the user.

First name

Optional: Enter the first name of the user.

Last name	Optional: Enter the last name of the user.
Password	Type and confirm a password for the user. Ensure the password follows any necessary password policy.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. Click the URL in the email to log in to the Enterprise Control Room and set up your credentials. All important Enterprise Control Room notifications will be sent to this email address.

5. In the Select Roles section, select one of the following roles from the Available roles column:

Role	Select this role
Admin	AAE_Robotic Interface Admin
Manager	AAE_Robotic Interface Manager
User	AAE_Robotic Interface User

6. Click the right arrow to move the role to the Selected column.

7. In the Allocate a device license section, select the following:

Role	Action
Admin	Retain the default None. The user with administrator role has access to the Enterprise Control Room and AARI on the web.
Manager	Retain the default None. You can optionally assign the AARI user license to create a request or submit tasks. The user with manager role has access to AARI on the web.
User	Assign the AARI user license. You can also optionally assign the attended Bot Runner license to run local bots or use the desktop interface. The user has access to AARI on the web.

8. In the AARI licenses section, select the AARI user check box.

9. Click Create user.

The new user is displayed in the User table. If SMTP is enabled, an email will be sent to the new user inviting them to log in.

Automation Anywhere Robotic Interface processes

You can design, check in or check out, and import or export a process using Automation Anywhere Robotic Interface (AARI).

Design a process

An AARI user with a Bot Creator license can design a process workflow with human and bot steps in the Enterprise Control Room (My Bots page) to capture business requirements and workflows. The process workflow enables the user to create, view, modify, or delete a process. A process contains the following:

- An entry form which is the first step in a process.
- A sequence of process elements as follows:
 - Forms or TaskBots
 - Input, output, and meta-variables to share data
- Logic conditions such as If, Else for internal and conditional branching of the process.
- End states to close each request such as completed, failed, or canceled.

You can run the process either in the public or the private workspace using the Run option in the process editor. The bots in the private process executes on the default device of the Bot Creator.

When the private process is executed, the Bot Creator can create a request, enter data in the initial form, and run their request from the private workspace. Requests created from the private process execution can be viewed only by the user creating the request. Requests created from the public process execution can be viewed by the AARI administrator. Managers and users can view the requests only if they have access to the process.

Design a form

An AARI user with a Bot Creator license can create a form and enter the required data using form elements that can be rendered in the web interface. They can add or remove form actions during the process creation.

As a user, you can interact with the form only when it is assigned to you. If the form is unassigned, it is not enabled and is read-only. To edit the form, you can assign the form either to yourself or to any member of the team who has access to the process. After editing the form, the assignee can either submit the form or use any other action options. After the form is submitted or an action option is used, the case view displays the next step or task.

The following elements are supported in a form:

- Check Box
- Date
- Drop-down
- Label
- Number
- Password
- Radio Box
- Text Area
- Text Box

Using TaskBot in a process

An AARI user with a Bot Creator license can create a TaskBot that will execute inside the process using the input and output variables. When the Use as input check box is selected, the process passes data into the input variables, and when the Use as output check box is selected, the process gets data from the output variables after the bot execution.

Check in and check out a process

An AARI user with a Bot Creator license can check in a process and its dependencies in the My bots repository from the private workspace to the public workspace. The creator can view the checked-in processes and its dependencies in the same folder structure in the public workspace. To edit a checked-in process, creator can check out the process and its dependencies from the public workspace to their private workspace.

- [Check in an AARI process](#) on page 917
- [Check out an AARI process](#) on page 918

Import and export a process

User with an admin role or a creator with import, export, and manage package permissions can import or export a process and its dependencies and upload or download it to the web interface.

- [Import an AARI process](#) on page 918
- [Export an AARI process](#) on page 919

Create an AARI form

Create an Automation Anywhere Robotic Interface (AARI) form to provide interaction between humans and bots. You can enter the required data using form elements that can be rendered in the web interface. You can add or remove form actions when creating the process.

- You must have a Bot Creator license.
- You must be assigned a custom role with the create folder permission.

Forms in AARI can be displayed in two scenarios:

- Case creation: This is the initial form that is displayed when you want to create a new case and enter the required business data.
- Form step: This form is displayed to show information and prompt for additional inputs.

1. Click Bots > My Bots > Create new > Form.
2. In the Create form page, enter a name for the new form.
Forms are saved in the \Bots\ folder by default. Click Browse to change the default folder.
3. Click Create & edit.
The form builder page appears with a single row Column layout.
4. If you want to delete a row, click the vertical ellipsis in the form layout and click Delete row.
5. Confirm the delete action in the confirmation message.
6. Drag the required element into the form from the Elements panel on the left.
7. Use the Properties panel on the right to update or change the form properties.

8. Click Save.
9. Click Close.

[Create an AARI process](#) on page 912

Create an AARI process

Create an Automation Anywhere Robotic Interface (AARI) process work flow to address your business requirements. The process is created in a process editor that incorporates human and bot tasks.

- You must have a Bot Creator license.
 - You must be assigned a custom role with the create folder permission.
1. Create a process.
 - a) From your local machine, log in to your Enterprise Control Room as a Bot Creator.
 - b) Click Bots > My Bots > Create new > Process.
 - c) In the Create process page, enter a name for the new process.
Processes are saved in the \Bots\ folder by default. Click Browse to change the default folder.
 - d) Click Create & edit.
 - e) Optional: Click the process name to rename it.
 2. Add an initial form to the process by clicking Start.
 3. From the Start panel, perform these steps:
 - a) Browse and Select initial data form.
 - b) In the Request display name field, enter any text or insert a variable.
This is the input variable. A dynamic title is created for this request that will be displayed in the web interface and will serve as a reference.
 - c) Optional: In the Data privacy tag field, enter a text or variable to generate hidden custom output.
 - d) Click Apply.
 4. Add Bot Task to the process by dragging the element from the Element panel.
 5. From the Bot Task panel, perform these steps:
 - a) Enter a name in the Element name field.
 - b) Enter the task name in the Task display name field.
The task display name appears in the web interface as a reference.
 - c) Optional: Select the Hide this task after completion check box.
After task completion, the Bot Task is not displayed to the user in the web interface.

To display the hidden task, select the View hidden tasks check box in the tasks view page of the web interface.
 - d) Browse and select the TaskBot.
 - e) Optional: In the Data privacy tag field, enter a text or variable to generate hidden custom output.
 - f) Select the check box in Input values and specify a variable.
The variable input expected by the bot is mapped with the variable that will be populated when creating the request.
 1. Select a task in the Process task field.
 2. Select a type in the Variable type field.

You can choose Input, Output, or Meta.

See [AARI variable types](#) on page 915.

3. Specify your variable in the Variable field.

- g) Click Apply.

6. Add a condition to the process by dragging the condition from the Elements panel.

You can choose If/Else pair or Else if.

7. From the Condition panel, perform these steps:

- a) Optional: Add a description in the Description field.

- b) Optional: Add a message in the Display message field.

The display message you enter is shown in the request view page in the web interface.

- c) Click Add Condition to add a condition.

You can choose a condition from the four available types: Boolean, Datetime, Number, or String.

- d) Click Apply.

8. Add the Human Task to the process by dragging the element from the Element panel.

9. From the Human Task panel, perform these steps:

- a) Enter a name in the Element name field.

- b) Enter the task name in the Task display name field.

The task display name is displayed in the web interface as a reference.

- c) Optional: Select the Hide this task after completion check box.

After task completion, the Human Task is not displayed to the user in the web interface.

To display the hidden task, select the View hidden tasks check box in the tasks view page of the web interface.

- d) In the Auto assign this task to option, verify and select the user to assign the task.

You can choose either The user who created the request or The manager of the user who created the request. The user or manager you select can automatically view the task assigned to them in the web interface.

- e) In the Select form field, browse and select the second form created.

This form displays the result.

- f) Optional: In the Data privacy tag field, enter a text or variable to generate hidden custom output.

- g) In the Add form button field, specify your button details.

- Specify a name in the Button label field.

- Select a style in the Button style field.

You can choose between Primary, Secondary, or Cancel.

- Click Add button to add any additional buttons.

- h) Select the check box in the Feed data into form field.

1. Select a task in the Process task field.

2. Select a type in the Variable type field.

You can choose Input, Output, or Meta.

See [AARI variable types](#) on page 915.

3. Specify your variable in the Variable field.
10. Optional: Add the Process Task option to the process by dragging the element from the Task panel.
 11. From the Process Task panel, perform these steps:
 - a) Enter a name in the Element name field.
 - b) Enter the task name in the Task name field.
The task display name appears in the web interface as a reference.
 - c) Optional: Select the Hide this task from users check box.
After task completion, the Process Task is not displayed to the user in the web interface.

To display the hidden task, select the View hidden tasks check box in the tasks view page of the web interface.
 - d) Select either the Public folder or Private folder and browse and select the process.
 - e) Optional: In the Data privacy tag field, enter a text or variable to generate hidden custom output.
 - f) Select the check box in Input values and specify a variable.
 1. Select a task in the Process task field.
 2. Select a type in the Variable type field.
You can choose Input, Output, or Meta.
See [AARI variable types](#) on page 915.
 3. Specify your variable in the Variable field.
 12. Add the Filter Task option to the process by dragging the element from the Task panel.
 13. From the Filter Task panel, perform these steps:
 - a) Enter a name in the Element name field.
 - b) Enter the task name in the Task display name field.
The task display name is displayed in the web interface as a reference.
 - c) Optional: Select the Hide this task check box.
After task completion, the Filter Task is not displayed to the user in the web interface.

To display the hidden task, select the View hidden tasks check box in the tasks view page of the web interface.
 - d) Enter a variable in the Variable to be filtered field.
 - e) In the Filtered type field, select an option.
For example, for a dictionary variable, the Check each key/value pair in the dictionary or Check entire dictionary options are available for you to choose.
 - f) In the Filter criterion field, select a condition.
After you select a condition, specify the Source variable, Operator, and Target value fields.
 14. Add the End point by selecting the Go to or End process.
 15. From the End point: Go to panel, perform these steps:
 - a) In the Select target task option, specify the task by choosing Bot Task or Human Task.
 - b) In the Auto assign this task to option, verify and select a user to assign for the task.

You can choose The manager of the user who created the request. The manager selected can view the task assigned to them in the web interface automatically.

16. From the End point: End process panel, perform these steps:
 - a) Choose the type in the End process status field.
You can choose between Completed, Failed, or Cancelled.
 - b) Optional: Specify a name in the Update request title field.
 - c) Optional: Add a message in the Display message field.
The display message you enter is shown in the last step of your task in the request view.
 - d) Click Apply.
 - e) Click Save to save the process.
17. If you want to preview your bot or forms information in the process editor (Edit process page) in both your public and private workspace, follow these steps.
 - a) Click the vertical ellipsis next to the Bot Task or the Human Task.
 - b) Select either the Preview bot or Preview form option.
In the public workspace, these options display the Bot name preview or Form name preview page. The page enables you to quickly view a bot or form.
In the private workspace, these options display the Edit Task Bot or Edit form page in which you can make changes to your TaskBot or form.

Related tasks

[Create your first bot](#) on page 418

Follow these steps to create your first bot that prints the message, Go be great!, the Automation Anywhere version of Hello World!

[Create an AARI form](#) on page 911

Create an Automation Anywhere Robotic Interface (AARI) form to provide interaction between humans and bots. You can enter the required data using form elements that can be rendered in the web interface. You can add or remove form actions when creating the process.

AARI variable types

Data flow (workflow engine) is the core part of a process that moves data between each task. Tasks require variables in order to run properly and three types of variables are available: input, output, and meta-type variables.

Variable types

Input	Users can use this type of variable in the process editor to return values that went "in" a task.
Output	Users can use this type of variable in the process editor to return values that went "out" a task.
Meta	Users can use this type of variable in the process editor to return high-level information about the request of a task.

Variable entities

Two types of entities can hold variables:

Request

Requests can only hold meta-type variables and have the following form: `$<meta variable name>]` \$

This meta-type variable value is from the request.

Task

Tasks can hold three types of variables (input, output, meta) and have the following forms:

- `$<task>.<input|output>[<variable name>]` \$: This variable value is read from the task input or output.
- `$<task>.<meta variable name>]` \$: This meta-type variable value is read from the task.

Date time variables

Name	Entities	Description
createdOn	Request, Task	Shows the date when the request or task was created Example: \$createdOn\$ or \$Approval_Task.createdOn\$
updatedOn	Request, Task	Shows the date when the request or task was last updated Example: \$updatedOn\$ or \$Approval_Task.updatedOn\$

Dictionary variables

Name	Entities	Description
assignedTo	Task	Shows information about the user who is assigned to the task Dictionary key: {id}, {username}, {email} Example: \$Approval_Task.assignedTo\$
createdBy	Request	Shows information about the user who created the request Dictionary key: {id}, {username}, {email} Example: \$createdBy\$

Number variables

Name	Entities	Description
executionCount	Task	Shows the number of times the task was run. Example: \$Name_Bot.executionCount\$
id	Request, Task	Shows the numerical ID of a request or task. Example: \$id\$ or \$Approval_Task.id\$
assignedTo{id}	Task	Shows the numerical ID of the user who is assigned to the task. Example: \$Approval_Task.assignedTo{id}\$
createdBy{id}	Request	Shows the numerical ID of the user who created the request. Example: %createdBy{id}\$

String variables

Name	Entities	Description
status	Task	Shows the label of the button clicked (action) for a task or the return code for a bot task (equal to failed when the task fails). Example: %Approval_Task.status\$ or \$Name_Bot.status\$
title	Request, Task	Shows the title of the request or task. Example: %title\$ or %Approval_Task.title\$
type	Request	Shows the task type (equal to BOT for bot tasks). Example: %Task.type\$
assignedTo{username}	Task	Shows the username of the user who is assigned to the task. Example: \$Approval_Task.assignedTo{username}\$
createdBy{username}	Request	Shows the username of the user who created the request. Example: \$createdBy{username}\$
assignedTo{email}	Task	Shows the email of the user who is assigned to the task. Example: \$Approval_Task.assignedTo{email}\$
createdBy{email}	Request	Shows the email of the user who created the request. Example: \$createdBy{email}\$

Check in an AARI process

Check in an Automation Anywhere Robotic Interface (AARI) process to the public workspace from the private workspace to make it available for other users.

- You must have a Bot Creator license.

- You must be assigned a custom role with the following permissions:
 - Required: Check-in and check-out permission
 - Optional: Create folder permission
 - Optional: View packages permission
 - To check in a process with dependent folders and files, ensure you have the following:
 - Create folder permission.

If you are checking in a process from your private workspace and if the folder in which the process is present does not yet exist in the public workspace, you must have the create folder permission to successfully check in the process.
 - Check-in permission on the dependency folder.
1. Log in to the Enterprise Control Room as a Bot Creator user.
 2. In the private workspace, click Bots > My bots.
The My bots page is displayed with the list of folders or files containing the processes.
 3. Select the process you want to check in, open the actions menu (vertical ellipsis), and click Check in process.
 4. In the Check in Process window, add your comment and click Check in.
The process appears in the same folder structure in the public workspace.

Check out an AARI process

Check out an Automation Anywhere Robotic Interface (AARI) process from the public workspace to create an editable copy of the process.

- Ensure you have the Bot Creator license to check out a process to your private workspace.
 - To check out a process with dependent folders and files, you must have the following:
 - Create folder permission
 - Check-out permission on the dependency folder
1. Log in to the Enterprise Control Room as a Bot Creator user.
 2. In the public workspace, click Bots > My bots.
The My bots page is displayed with the list of folders or files containing the processes.
 3. Select the process, open the actions menu (vertical ellipsis), and click Check out process.
The process appears in the same folder structure in the private workspace.

Import an AARI process

You can import an Automation Anywhere Robotic Interface (AARI) process from one Enterprise Control Room to another.

- Ensure that the following rights are enabled to import processes:
 - Import process permission
 - Create folder permission, if it is required
 - Check-in permission
 - Manage package permission
- The process directory path is case-sensitive. So ensure that the export and import paths use the same case in the Enterprise Control Room to avoid any process execution failure.

- You require a Bot Creator license to import the process either into the private or public workspace.

In this task, the required process is already exported and an email is received with a link to the zip file containing the package to import.

Any previously exported process is located in the public repository and must be imported and checked in so that it can be deployed from the new Enterprise Control Room.

You can import the process only into your private workspace. After the process is imported, you must then check in the imported files to the public workspace in order to complete the import process activity.

1. Navigate to BOTS > My bots.
2. Click Import bot and browse and select the process to import.



Note: This option currently applies to both bots and processes.

3. Select the option to import a process into the private or public workspace.
4. Set the option for importing the process based on whether a previous version of the process resides in the destination location.

During the import, if a file already exists, you can choose to either skip the process during import or overwrite the existing process and file.

5. Click the Import bot icon.
6. Navigate to the private repository to find and select the imported process.
7. Click Check in process.



Important: All related dependencies are checked in. If the process is imported to a public folder, then it has to be checked out and then checked in again for it to appear on the web interface. However, if the process is imported to a private folder, then it can only be checked in but not checked out.

8. Update the comment for the check-in process.
9. Click Check in.
On completion, the imported process is placed in the public repository and is ready for deployment from the new Enterprise Control Room.

Export an AARI process

You can export an Automation Anywhere Robotic Interface (AARI) process from one Enterprise Control Room to another.

- Only processes within the public workspace can be exported. To export a process, check in the process into the public workspace.
- Ensure that you have the correct role and permissions to export the process, including the View package permission.
- To receive the link to the exported package through email, enable SMTP.

[Configuring email server](#) on page 589

- To export the process from one Enterprise Control Room to another, both Control Rooms must be the same version.

The Enterprise Control Room maintains a maximum of 10 GB of historical export files in the download directory. Files are deleted on a first-in/first-out basis in order to maintain this threshold.

1. Navigate to BOTS > My bots.
2. Click the Export bot, browse the public directory, and select the process to export.



Note: This option currently applies to both bots and processes.

The selected process as well as the required dependencies are displayed.

3. Click Next.

The process and its dependencies are ready for export and displayed in the Review Dependencies window.

4. Click Next.

All related packages are displayed.

5. Select the necessary packages associated with the process to export.

You can select Exclude process packages to remove all packages from the export.

6. Click Export bots and files.

If you have configured SMTP, an email is sent, which contains a link to the zip file of the exported package.

If you have not configured SMTP, perform the following steps to access the link to the zip file of the exported package:

a) Navigate to ACTIVITY > Historical.

b) Search and view the historical activity of the exported package.

c) Click Download exported zip file.

A link to download the zip file is displayed.

7. Use the link to download the zip file and save it to a location for importing it to another Enterprise Control Room.

Import the process to an Enterprise Control Room.

Using AARI on the web

You can use Automation Anywhere Robotic Interface (AARI) on the web for team and process management tasks and for managing existing forms.

Key features

Create a request

Creators with the AARI user license can automate their processes by creating a new request or case. The Create request option on the main page enables creators to select their process, enter the process descriptions, and run their request (case) in a viewable request tab. They can run multiple requests at the same time without impacting their running tasks.

Search a process

Creators can enter keywords in the search field to search for processes. The keywords can be searched by the process name, description, and tags. The search is filtered immediately as the creator enters the search terms.

Sort a request by filter

Creators can use the Filter to sort their requests by status, IDs, title, and tags. They can select multiple

	filter options, such as active or closed status, for an accurate sort.
Pin a process	Creators can pin any of their favorite or most-used processes. The pinned process appears in the Pinned tab next to the All tab. When creators pin a process or remove a pin, they stay on the current tab and are not redirected.
Select a process	Creators can only view and select processes that are assigned to them on a team. They can be a team member of multiple teams.
Process tags	Users with the manager role can add a maximum of three tags to a process. The tag name must be unique, cannot be duplicated, and has a maximum limit of 25 characters. These tags are global and viewable by everyone. These act as a label with no description. Managers can manage tags in the process management page.
Process management	Users with the admin role can access the process management page to view all checked-in processes from the Enterprise Control Room public folder. They can add managers to a team and assign responsibilities. The manager can access the process management page to manage assigned processes and teams of creators. The admin can assign a process to a team they created and be the manager assigned to that process. The admin can also assign a process to a team they did not create and the manager of that team is assigned to the process.
Initial form	The creator who requests a process is required to enter the process information and requirements in an initial form. This form supports dates, texts, numbers, single or multiple choice options, files, and screenshots. The Submit option confirms the data and sends the information to the back-end server.
Request view	The creator's requests (case) can be viewed in the request view window that contains high-level details of the tasks, such as names, status, date, and time. The task information is displayed in the request tabs for creators to edit and verify.

Accessing AARI on the web through Enterprise Control Room

To run automations in the web interface, the administrator must select a device pool in AARI. The administrator can configure the device pool in the Enterprise Control Room My device pools tab. After the device pool is configured, the link to navigate to the web interface is activated and the administrator uses the link to switch to the web interface.



Note: AARI managers and creators can access the web interface by adding /aari/ at the end of their Enterprise Control Room URL.

Configuring pool of run-as users

The administrator with permission to manage device pools can select unattended users on the web interface in order to execute all the AARI processes.

Unattended users are created in the Enterprise Control Room by the Enterprise Control Room administrator.

Create a request

You can create a new request from processes that are assigned to your team, fill an initial form, and complete your request.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface User role for the AARI user.
- Assigned the AARI user license.
- Have access to AARI on the web.

You can create a new request from processes in AARI to automate your business requirements.

You can create multiple requests and run them at the same time.

1. Log in to the web interface as an AARI user.
2. Click Create request.
A window appears and shows a list of available processes that are assigned to your team.
3. Select a process.
After you selected a process, you are prompted with the initial form.
4. Enter the required information to the initial form.
5. Click Submit to progress.
You can optionally click Cancel to discard your changes.
6. View the request view.
Your process is now running, and you might be prompted to complete pending tasks in the request tabs.
7. Enter or click the required task information in the request tab.
8. View your process status.
Your process is now completed.
9. Navigate to your main page to view all your requests.

Delete a request

An AARI user, manager, or administrator can delete requests that are no longer required. Deleting requests helps clear the memory space. You can also recover a deleted request if necessary.

Ensure you have completed the following:

- Assigned a system-created AAE_Robotic_Interface User role for the AARI user, AAE_Robotic_Interface Manager for the AARI manager, or AAE_Robotic_Interface Admin role for the AARI administrator.
- For the AARI user, manager, or admin:

- Assigned the AARI user license.
- Provided access to AARI on the web.

Only requests that are in Aborted, Cancelled, Failed, or Completed status can be deleted.

- An AARI administrator can delete any requests.
 - The AARI manager can delete requests of the team for which they are the owner.
 - The AARI user can delete only the requests they have created.
1. Log in to the web interface.
 2. Navigate to the Request tab.
 3. From the list of requests, select the request or requests you want to delete and click the delete icon.
A confirmation message appears to confirm the deletion.
 4. Click Yes, delete to delete the selected requests.
 5. Optional: To recover a deleted request or requests, perform these steps:
 - a) Navigate to the Recycle Bin tab.
 - b) Select the requests you want to recover and click the recover icon.
A confirmation message appears to confirm recovery of the request.
 - c) Click Yes, recover.
The requests are recovered and appear in the Requests tab.

Assign a task

The Automation Anywhere Robotic Interface (AARI) manager and user can assign specific tasks to their team.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface Manager role for the AARI manager.
- Provided a system-created AAE_Robotic_Interface User role for the AARI user.
- Have access to AARI on the web.

Managers can assign tasks to all members who have access to a process. Users can assign tasks to other users in the same team. Managers and users can unassign tasks.

1. Log in to the web interface as an AARI manager.
2. Navigate to the Tasks tab.
3. Select a task from the list.
4. Navigate to Unassigned.
Tasks are unassigned by default.
5. Select a user.
The task is now assigned.
6. Optional: Select Unassigned.
The task is now unassigned.

View and search for a process

The AARI user can view, pin, or search their assigned processes.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface User role for the AARI user.
- Assigned the AARI user license.
- Have access to AARI on the web.

1. Log in to the web interface as an AARI user.
2. Click Create request from the home page and choose from these options:

Option	Steps
View a process	View your assigned process in the Select a process window.
	 Important: A list of processes is available in the All tab by default and are assigned to your team by the manager.
View a pinned process	a. Click the pin icon. b. Navigate to the Pinned tab. c. View your pinned process.
Search for a process	a. Click Create request from the home page. b. Navigate to the search bar. c. Enter your keyword. The search bar dynamically searches your processes for common keywords. You can also search for tags. d. View the searched process.

Filter and search for a request

When an AARI user has created many requests, they can quickly search for a specific request.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface User role for the AARI user.
- Assigned the AARI user license.
- Have access to AARI on the web.

Follow these steps to quickly search or filter your requests:

1. Log in to the web interface as an AARI user.
You are now in your home page, where you can view your requests.
2. Navigate to the Requests tab (set by default) and choose from these options:

Option	Steps
Sort	- Click on a column. You can choose from: Status, Request ID, Process, Request title, Created , Updated or Tag. The column is sorted to ascending order by default. - Optional: Click the same column again. The column is now sorted to descending order by default. - View your sorted requests.
Search	- Click Search title. - Search a request title. The search bar dynamically searches for common keywords. - Optional: Click x to clear keywords. - View the searched requests.

Option	Steps
Filter	a. Click Filter. b. In the dedicated filter window that appears, configure your content from these filters: 1. Select a status in the Status option. You can choose from Open, Closed, Failed, and Cancelled. 2. Select a date in the Created option. You can select the current date or specify any dates in the From and To fields. 3. Select a date in the Updated option. You can select the current date or specify any dates in the From and To fields. 4. Enter an ID in the Request ID field. 5. Enter a process name in the Process field. 6. Enter a tag name in the Tags field.  Note: When you confirm your search criteria for the Request ID, Process, and Tags fields, you create a custom filter tag. 7. Optional: Enter the query in the Data Privacy tag field.  Note: This option is available only for the AARI admin. The admin can update the field and manage any information about data privacy. c. Optional: Click x to discard any custom filter tags. d. Optional: Click Reset to discard all changes. e. Click Apply. f. View your filtered requests.

Filter and search for a task

When the AARI user has created many tasks, they can quickly search for a specific task.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface User role for the AARI user.
- Assigned the AARI user license.
- Have access to AARI on the web.

Follow these steps to quickly search or filter your tasks:

1. Log in to the web interface as an AARI user.
You are now in your home page, where you can view your tasks.
2. Navigate to Tasks tab and choose from these options:

Option	Steps
Sort	a. Click on a column. You can choose from: Status, Task Name, Assignee, Request ID, Request title Task Created , Task Updated. The column is sorted to ascending order by default. b. Optional: Click the same column again. The column is now sorted to descending order by default. c. View your sorted tasks.
Search	a. Click Search task. b. Search a task name. The search bar dynamically searches for common keywords. c. Optional: Click x to clear keywords. d. View the searched tasks.

Option	Steps
Filter	a. Click Filter. You can also filter your tasks and choose from My Completed tasks, My Pending tasks, and Unassigned tasks. b. Click Advanced filter. c. In the dedicated filter window that appears, configure your content from these filters: 1. Select a status in the Status option. You can choose Pending and Completed. 2. Select a date in the Task created option. You can select the current date or specify any dates in the From and To fields. 3. Select a date in the Task updated option. You can select the current date or specify any dates in the From and To fields. 4. Enter a name in the Assignee field. 5. Enter an ID in the Request ID field. 6. Enter a name in the Request title field.  Note: When you confirm your search criteria for the Assignee, Request ID, and Title fields, you create a custom filter tag. 7. Optional: Enter the query in the Data Privacy tag field.  Note: This option is available only for the AARI admin. The admin can update the field and manage any information about data privacy. d. Optional: Click x to discard any custom filter tags. e. Optional: Click Reset to discard all changes.  Tip: You can also navigate to Filter > Reset filter for the same results. f. Click Apply. g. View your filtered tasks.

Configure scheduler user for AARI on the web

You can configure a scheduler user to allocate the Enterprise Control Room resources (devices and unattended Bot Runners) to AARI on the web interface.

You must create a custom role in the Enterprise Control Room.

1. Log in to the Enterprise Control Room as an Enterprise Control Room admin.
2. Navigate to Administration > Roles.
3. Create a custom role (for example: AARI-pool-scheduler).
[Create and assign roles](#) on page 1110
 - a. Set your permissions to View my bots, View packages and Run my bots.
 - b. Select your unattended users in the Run As section.
 - c. Select the AARI admin and unattended users in the User section.
 - d. Save your changes.
4. Create a user (for example AARI-scheduler-user) and assign the custom role (AARI-pool-scheduler) to this user.

1. Log in to the Enterprise Control Room as an AARI admin.
 AARI admins can create device pools in the Enterprise Control Room.
2. Navigate to Devices > My device pools.
3. Create a device pool (for example: AARI-pool).

[Create device pools](#) on page 1074



Note: The owner of the device pool is the AARI admin. At least one device pool is required for configuring AARI on the web.

4. Select your custom role (AARI-pool-scheduler) in Device Pool Consumers.
5. Save your changes.
6. Click configuration page to navigate to the web interface.
7. Click Edit.
8. Enter the Username (for example, `AARI-scheduler-user`) and click Authorize.
 The AARI process uses the device pool and unattended Bot Runners configured with this user for each bot deployment.

Assign members and process to an AARI team

An AARI admin can add managers to assign a process to a team in AARI.

Ensure you have completed the following:

- Provided a system-created AAE_Robotic_Interface Admin role for the AARI admin.
- Provided a system-created AAE_Robotic_Interface Manager role for the AARI manager.
- Have access to the AARI on the web.

1. Log in to the web interface as an AARI admin.
2. Navigate to the process management page.
3. Click your assigned process.

A window appears and shows related information about your process such as descriptions, tags, managers, and teams.

4. Click the + (plus) icon.
5. Click Add managers.
6. In the Add managers window, search in the search bar for a manager.
You can add more than one manager if required.
7. Click Add.
8. Click Save.
9. Log out of the web interface.
10. Log in to the web interface as a manager.
11. Navigate to the team management page.
You can now create, edit, or delete teams.
12. Click the Create new team option.
13. Enter a new name in the Team Name field.
14. Optional: Enter a description in the Description field.
15. Click the + (plus) icon.
16. Click Add members.
17. In the Add members to window, search for an AARI user in the search bar .
You can add more than one user if required.
18. Click Apply.
19. Optional: To remove an assigned member, navigate to the Members tab, select Member field next to an assigned user, and click Remove from team.
20. Click the + icon.
21. Click Add processes.
22. In the Assign Processes window, select an assigned process.
23. Click Assign to Team.
24. Optional: To remove an assigned process, navigate to Assigned Processes tab, select Unassign next to the assigned process.
25. Click Save.

Get started with AARI desktop

Use Automation Anywhere Robotic Interface (AARI) through your desktop to manage routine tasks such as validating data, retrieving approvals, and managing escalations through bots.

The following workflow describes how to use AARI to automate and manage your tasks:

1. Create a user:
 - The Enterprise Control Room administrator creates a user with a Bot Creator license.
[Create a user](#) on page 1106 | [Enterprise A2019 licenses](#) on page 392
 - The user logs in to the Enterprise Control Room to start building bots.
[Install Bot agent and register device](#) on page 400 | [Get started building bots](#) on page 885
2. Create forms using the Interactive forms package:
 - Interactive forms enable you to design forms for submitting and regrouping data from various applications.

[Create a form](#) on page 931

- Link the form to a newly created bot or an existing bot using the Bot editor interface.

[Add a form to bot](#) on page 944

3. Add triggers to the bot:

Trigger loop enables you to add triggers that can run a task automatically when certain predefined events occur.

[Adding a trigger to run a bot](#) on page 945

Using interactive forms

Interactive forms enable you to build forms for submitting and regrouping data that is used to send and receive information from various applications within your attended automation process.

Interactive forms provide a list of actions that you can drag into a bot as a task logic. Specific function of each action is displayed when you hover over them. The actions within the interactive forms can be broadly classified into the following types:

Form level actions

Represented by  and used within a task logic to manage the linked form.

Element level actions

Represented by  and used to manage elements of a form.

Watch the following video to understand how to use Interactive forms in Enterprise A2019:

Create a form

The form builder in Enterprise A2019 enables you to create or edit forms using various form elements available through a browser interface. A form provides structural content with little or no changes in the layout. You can link a form to bots that perform predefined automated tasks.

The form builder requires no additional installation over the Bot agent. Enterprise Control Room users with the Bot Creator license can access the form builder to design a new form or edit an existing form.

This task provides an example scenario where you create a new user registration form that captures all the necessary information. When you link this form to a bot, it can trigger a third-party application to store user information.

1. Click BOTS > My Bots > Create new > Form.
2. In the Create form page, enter a name for the new form.
Forms are saved in the \Bots\ folder by default. Click Browse to change the default folder.
3. Click Create & edit.
The form builder page appears with a single row Column layout.
4. Use the Properties panel on the right to update or change the form properties.
 - a) Enter the title in the Form title field.
 - b) Use the Formatting fields to set the display font or the font size of the form elements.



Note: Use the Font name drop-down menu to select an English-only font.

If you have used any of the supported non-English languages for the form elements, select Font name > System default. For example, if you added an element label or text

in Japanese, select Font name > System default for the form elements to be displayed in Japanese during the bot runtime.

-
- c) Use the Dimensions field to set the width and height of the form.
 - d) Use the Display behaviors field to set the way the form is displayed on the user desktop.
 - e) Set a variable using Hidden elements.
For example, if the registration form is linked to a Social Security Number (SSN) that cannot be displayed to users, select the hidden element Type as Number. A user with a Bot Creator license can then access this variable when creating a bot.
5. Optional: Click Preview.
The form preview screen enables you to view the display resolution of the form and change the form position on the user's desktop. You can either enter the values for the X and Y coordinates or drag the form using the cursor to update the corresponding X and Y coordinates dynamically.
 6. Optional: Drag Column to arrange elements horizontally.
For example, if you want the first name and last name fields to appear next to each other on the form, drag Column into the form. Then drag two text boxes into the columns. Use the row properties to customize the number of columns and the column width.
Click Delete or select any element and press the Delete button from the keyboard to remove it from the form.
 7. In this scenario, drag the following elements into the form:
 - a) Textbox: Enter First Name in the Element label field of the first text box, and enter Last Name in the Element label field of the second text box.
 - b) Number: Enter Contact Number in the Element label field.
For a new user registration form, some of the fields such as contact number might be mandatory. Use the Advance behaviors to make it mandatory and the Formatting option to set the input format.
 - c) Radio Button: Update the Element label as Gender. Change the values for the Radiobutton1 as Male and Radiobutton2 as Female.
 - d) Date: Enter Date of Birth in the Element label field.
 - e) Textbox: Enter Email ID in the Element label field.
 - f) Dropdown: Update the Element label as Newsletter. Enter Daily, Weekly, Monthly, or None in the Add dropdown content field.
In this scenario, you can use the Dropdown element to create a newsletter option for the new user. This can be used to trigger an email based on the selected option.
 - g) Button: Enter Submit in the Button-text (required) field.
 - h) Drag another Button element and enter Cancel in the Button-text (required) field.
Use the Button type drop-down menu and set this as Secondary.
 8. Optional: Click Preview.
Use this feature to preview the appearance of the form based on the resolution of the destination device.
 9. Click Save.
The new registration form is created and is ready to be linked to a bot.

Using the Button element

Use the Button element in the form builder to validate or cancel a form during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Button into the form.
4. Enter the name of the element in the Button-text field.
5. Optional: Enter the hint text and tooltip.
6. Use the Button types drop-down menu to set the type of the button element.
For example, consider you have two buttons, Save and Cancel. Use Primary for Save and Secondary for Cancel.
7. Optional: Use the following Advance behavior options:
 - Disallow button click when this form is first loaded: Enable this option to disable the button element when the form is displayed for the first time during bot runtime.
 - Validate all form fields when this button is clicked: Enable this option to validate all available fields of the form when a user clicks this button element during bot runtime.
8. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
9. Click Save.

Using the Checkbox element

Use the Checkbox element in the form builder to enable users to select multiple options in a form during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Checkbox into the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter the hint text and tooltip for the check box element.
6. Use the Checkbox content fields to add multiple check boxes and enter a name for each one of them.
For example, if you are creating a sales chart form, use this field to add three check boxes and enter Product 1, Product 2, and Product 3.
7. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
 - If you have multiple check boxes in the form and want a default selection during bot runtime, select the Make default selections check box, and select the necessary option.
8. Use the Formatting field to set the vertical or horizontal layout of the check boxes.

9. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.

Using the Date element

Use the Date element in the form builder if the user must schedule a date in the form during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Date into the form.
4. Enter the name of the element in the Element label field.
5. Select a default date using the Default value field.
6. Optional: Select the Use the local system date when form is loaded check box to set your system date as the default value.
7. Select one of the following formatting options:
 - Use locale date format setting: The date is displayed in the format set on the user's machine.
 - Manual input: Select the date format to be displayed from the drop-down menu.
8. Enter the hint text and tooltip for the formatting option.
9. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
10. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
11. Click Save.

Using the Document element

Use the Document element in the form builder to render a document, such as an image (.jpg) or PDF, that you want to preview along with the form.



Note: Only one Document element can be used in a form.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Document into the form.
4. Enter the correct URL or the document location address in the Default file field.
5. Use the Formatting drop-down menu to set the position of the document element in the form.

6. Optional: Enter a specific width for the element in the Dimensions field.
7. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
8. Click Save.

Using the Dropdown element

Use the Dropdown element in the form builder to provide multiple options in the form during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Dropdown into the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter the hint text and tooltip for the check box element.
6. Use the Add dropdown content field to enter the items that must appear in the drop-down menu during bot runtime.
7. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
 - If you have multiple items in the drop-down element and want a default selection during bot runtime, select the Select default list item check box, and select the necessary option.
8. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
9. Click Save.

Using the Dynamic Area element

Use the Dynamic Area element in the form builder to display content that is not part of the form itself during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Dynamic Area into the form.
4. Enter the name of the element in the Element label field.
5. Use the Placeholder text field to enter the text that must appear if this element is empty during bot runtime.
6. Enter a specific height of the element in the Height field.
The default dimension value is set to 120 and enables a scroll bar if the additional content exceeds this value.

7. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
8. Click Save.
The Dynamic Area action is available during bot runtime to render this field.
See [Interactive forms package](#) on page 665.

Using the Select File element

Use the Select File element in the form builder to enable users to attach a file to the form. For example, if the registration form requires a new user to attach a photograph, you can use this element in the form.

1. Click BOTS > My Bots.
A list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Select File into the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter the hint text and tooltip for the element.
6. Use the Acceptable file format field to add all the supported file formats.
For example, if you want to allow users to only upload image files, enter `png`, `jpeg`, and `jpg`.
7. Optional: Choose one of the following Advance behavior options:
 - Select the Make field required check box to ensure users must select this element during bot runtime.
 - Select the Make field uneditable check box to set the element as a read-only option.
8. Optional: Choose one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
9. Click Save.
When you click Preview during bot runtime, the system default application is used to display the selected file.

For example, if Microsoft Excel is set as the default application and you use Select file to upload a `.xls` spreadsheet, the selected document is displayed in Microsoft Excel when you click Preview during bot runtime.

Users can click Browse to select a file or drag a file into the Select File element during bot runtime.

Using the Select Folder element

Use the Select Folder element in the form builder to enable users to upload a folder that contains a specified file type during bot runtime.

1. Click BOTS > My Bots.
The list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Select Folder into the form.

4. Enter the name of the element in the Element label field.
5. Optional: Select the Show list of supported files in the folder check box.
If you select this option, the supported file types are displayed below the Select folder form element during bot runtime.
6. Enter the supported file types for this element during bot runtime.
For example, if you want to allow users to only upload folders that contain documents or text files, enter `doc` and `txt`.
7. Optional: Enter the hint text and tooltip for the element.
8. Optional: Choose one of the following Advance behavior options:
 - Select the Make field required check box to ensure users must select this element during bot runtime.
 - Select the Make field uneditable check box to set the element as a read-only option.
9. Click Save.
Users can click Browse to select a folder or drag one into the Select Folder element during bot runtime.

Using the Hyperlink element

Use the Hyperlink element in the form builder if you want to assign a URL during bot runtime.

1. Click BOTS > My Bots.
The list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Hyperlink into the form.
4. Enter the text to be displayed for the URL in the Display text field.
5. Enter the link in the URL field.
6. Use the Open in browser drop-down menu to select a browser to open the URL.
If you select Google Chrome, the URL opens in Google Chrome during bot runtime.
7. Optional: Enter the hint text and tooltip for the check box element.
8. Click Save.

Using the Image element

Use the Image element in the form builder to enable users to attach an image file to the form. For example, you can use this element to add a company logo to the form during bot runtime.

1. Click BOTS > My Bots.
A list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Image into the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter a custom value for the height of the image.
6. Optional: Enter hint text and tooltip for the element.
7. Use the Desktop or network path to retrieve image field to specify the image filepath.
8. Click Save.

Using the Label element

Use the Label element in the form builder to add a read-only field in the form during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Label into the form.
4. Enter the name of the element in the Element label field.
5. Enter a tooltip that appears when the user points to the element.
6. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
7. Click Save.

Using the Number element

Use the Number element in the form builder if the form must have a field that allows the user to enter only numeric values during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Number into the form.
4. Enter the name of the element in the Element label field.
5. Set the default value for the element.
6. Enter the minimum and maximum number of characters that users can enter in this field during bot runtime.
7. Optional: Enter the hint text and tooltip for the check box element.
8. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
9. Use the Formatting options to enable users to enter negative values, trailing zeroes, and comma during bot runtime.
10. Use the Decimals drop-down menu to set the number of decimal places.
11. Use the Special characters field to enter the prefix and suffix labels for the element.
12. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
13. Click Save.

Using the Password element

Use the Password element in the form builder if the form must have a confidential or masked field. This element uses the masking feature by default and Credential Vault encryption to transfer data during bot runtime.

1. Click BOTS > My Bots.
The list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Password to the form.
4. Enter the name of the element in the Element label field.
5. Use the Formatting field for additional options:
 - Standard
 - Set the character limit for password using the Min and Max fields.
 - Enable additional security options for the password.
 - Custom
 - Click the Add regular expression option and enter a custom password in the Regular expression field.
 - Optional: Enter the same custom password in the Test Content field, and click Test regular expression to verify it works correctly.
6. Optional: Enter the hint text and tooltip.
7. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
8. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
9. Click Save.



Note: Use the view icon in the Password field to review the password during bot runtime.

Using the Radio Button element

Use the Radio Button element in the form builder if you want to enable users to select only one of the available options from a field during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Radio Button into the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter the hint text and tooltip for the check box element.
6. Enter the names of the radio buttons that will be displayed during bot runtime.

For example, if you are creating a client information form, use this field to add two radio buttons and enter **Male** and **Female**.

7. Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
 - If you have multiple radio buttons in the form and want a default selection during bot runtime, select the Make default selections check box, and select the necessary option.
8. Use the Formatting field to set the vertical or horizontal layout of the radio buttons.
9. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.

Using the Rich Text Editor element

Use the Rich Text Editor element in the form builder to insert a text editor in the form that provides various options to edit the content during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Rich Text Editor into the form.
4. Enter the name of the element in the Element label field.
5. Set the default value for the element that must appear in the element during bot runtime.
6. Enter the minimum and maximum number of characters that users can enter in this field during bot runtime.
7. Optional: Enter the height for the input area of the field and tooltip for the element.
8. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
9. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.

Using the Snapshot element

Use the Snapshot element in the form builder to provide the users a screen capture option on the form during bot runtime. The file is saved in the .jpg format.

1. Click BOTS > My Bots.
A list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Snapshot into the form.

4. Enter the name of the element in the Element label field.
5. Optional: Enter the hint text and tooltip for the check box element.
6. Optional: Choose one of the following Advance behavior options:
 - Select the Make field required check box to ensure users must select this element during bot runtime.
 - Select the Make field uneditable check box to set the element as a read-only option.
7. Enter a filepath in the Desktop path to save snapshot field where the snapshot file must be saved during bot runtime.
 Optionally, you can either allow the user to create a folder if the filepath is not available or change the destination folder of the snapshot file.
8. Enter the suffix text for the snapshot file.
 For example, if this element is used to capture sales information, enter `Sales`. The snapshot file is then saved with the text `Sales` added at the end.
9. Optional: Choose one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.
 When you click Preview during bot runtime, the system default application is used to display the snapshot file.
 For example, if Microsoft Photos is set as the default application to open `.jpg` files, the snapshot file is displayed in Microsoft Photos when you click Preview.

Using the Table element

Use the Table element in the form builder to insert a customizable table in the form that can be used to populate data during bot runtime.

1. Click BOTS > My Bots.
 A list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
 The form builder page appears.
3. Drag Table to the form.
4. Enter the name of the element in the Element label field.
5. Optional: Enter hint text for the element.
 For example, enter `View outpatients details` if the table is used to capture a list of outpatients.
6. Use the Rows before scrolling field to enter the minimum number of rows the table element must have before a scroll bar is added during bot runtime.
7. Add or remove the total number of columns.
8. Click Column settings for additional options.
9. In the Column settings page, click the Form element type drop-down menu to set the element type.
 For example, if you select Dropdown, use the Add dropdown content field to enter the items that must appear in the drop-down menu during bot runtime.
10. Optional: Click Make columns width equal.
11. Optional: Enable Advance behavior option:
 - Select Make table uneditable check box to enable a read-only view during bot runtime.
 - Select Include table actions check box to enable users to add, remove or edit the table rows during bot runtime.

If you use the table actions to delete all the rows from a table and then add a new row, the columns and rows of the table appear misaligned. Drag and resize any column to reset the alignment.

12. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
13. Click Save.

Using the Text Area element

Use the Text Area element in the form builder to insert a text field in the form for users to enter alphanumeric characters during bot runtime.

1. Click BOTS > My Bots.
List of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Text Area into the form.
4. Enter the name of the element in the Element label field.
5. Use the Default value field to enter the default text to be displayed in the element.
6. Enter the minimum and maximum number of characters that users can enter in this field during bot runtime.
7. Enter the height for the input area of the field.
8. Optional: Enter the hint text and tooltip for the check box element.
9. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
10. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
11. Click Save.

Using the Text Box element

Use the Text Box element in the form builder to insert a text box in the form.

1. Click BOTS > My Bots.
The list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Text Box into the form.
4. Enter the name of the element in the Element label field.
5. Enter the default text that must appear in the element.
For example, if this field is used in a registration form, enter `First name`, which is displayed during bot runtime.

6. Use the Formatting field for additional options:
 - Standard
 - Set the character limit using the Min and Max fields.
 - Custom
 - Click the Add regular expression option and enter a custom text in the Regular expression field.
 - Optional: Enter the same custom text in the Test Content field, and click Test regular expression to verify it works correctly.
7. Optional: Enter the hint text and tooltip for the element.
8. Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
 - Select the Mask data check box if you want the field to be masked by special characters when the user enters data during bot runtime.
9. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.

Using the Time element

Use the Time element in the form builder to set the time in the form during bot runtime.

1. Click BOTS > My Bots.
The list of available forms and bots is displayed.
2. Click an existing form or click Create new > Form.
The form builder page appears.
3. Drag Time into the form.
4. Enter the name of the element in the Element label field.
5. Select a default time using the Default value field.
6. Optional: Select the Use the local system time when form is first displayed check box to set your system time as the default value.
7. Use one of the following formatting options:
 - Set the time to 12 Hours or 24 Hours format.
 - Enter the hint text and tooltip.
8. Optional: Enable any of the following Advance behavior options:
 - Select the Make field required check box to ensure users select this element during bot runtime.
 - Select the Make field uneditable check box to make the element a read-only option.
9. Optional: Click one of the following options:
 - Reset: Clears all the element customization and sets the default.
 - Delete: Deletes the selected element.
10. Click Save.

Add a form to bot

Adding an existing form to a bot enables users to collaborate with bots. Use the necessary action items to create a bot and build a task logic.

This task describes a scenario where you want to design a bot that triggers an existing New User Registration form. A Hot key preset trigger starts the bot. An existing form that is linked to the bot is displayed where the user enters the information.

- If the user clicks Submit, a User Agreement form is displayed.
- If the user clicks Cancel, User registration is canceled message is displayed and the bot is terminated.

1. Click BOTS > My Bots > Create new > Bot.
2. Enter a name for the bot.
All the bots are stored in the \Bots folder. Click Browse to change the folder.
3. Click Create & edit.
The bot builder pane is displayed that has Flow (default view), List and Dual view. You can drag the required actions from the left pane to create a task.
4. In Triggers > Hot key, drag Hot key trigger into Drag a trigger here in the bot logic.
5. Set Ctrl and L as the hot key combination.
6. Use the Search actions field to find Interactive forms.
7. Drag Display into the task logic.
You can use the display action to show the form when the bot is triggered. The display action properties appear on the right.
8. Click the create variable icon () to create a variable.
You have to create a form variable by linking an existing form. This enables you to use the form variable and the associated form across multiple instances.



Note: The form variable can be linked only to forms created using the Enterprise Control Room form builder.

9. On the Create variable screen, enter a name for the form variable you are creating.
10. Click Browse and select the New User Registration form.
This links the New User Registration form to the form variable that you are creating.
11. Click Create & select.
A new form variable is created. For any existing form variable, use the Form name drop-down menu to select it.
12. Use the Search actions field to find Trigger loop and drag it to add event monitoring.
Event monitoring enables you to simultaneously set multiple events within the task logic of a bot.
13. Drag Handle into the Trigger loop.
Handle enables you to run an action by configuring a trigger in the Trigger loop: Handle for the bot. You can set a trigger when a event occurs on the selected interface (selected application) or when a user clicks the selected form element.
14. For this scenario, use the Trigger on drop-down menu to select INTERACTIVE FORMS > Form trigger.
15. Click the Form name drop-down menu and select the New User Registration form.
This enables you to set a trigger for the Submit option of the New User Registration form.
16. Click the Form element drop-down menu and select Submit.

For the Button element of a form, the Select action trigger is set to Clicked by default. When the user clicks Submit on the New User Registration form, it triggers the User Agreement form.

17. Search for Interactive forms and drag Display into Trigger loop: Handle.
18. Click the Form name drop-down menu and select User Agreement form.
The User Agreement form appears.
19. Search for Message and drag it into Trigger loop: Handle, after Interactive forms.
A successful registration message appears when the user clicks Submit.
20. Terminate the trigger by dragging Break into the Trigger loop.
Use Break to exit the current event loop and for actions where finishing a process is required.
21. Drag another Handle next to the Trigger loop: Handle.
This enables you to set a trigger for the Cancel option of the New User Registration form.
22. Click the Form element drop-down menu and select Cancel.
23. Search for Message and drag it into Trigger loop: Handle. Update the Enter the message to display field as User registration is canceled.
When the user clicks Cancel on the New User Registration form, it triggers a User registration is canceled message and terminates the bot.
24. Drag Trigger Loop > Break to terminate the loop.
25. Click Save.
26. Click Run with triggers.
The Run with triggers sets the Hot key trigger to start the bot, which is Ctrl plus L combination from the keyboard in this scenario.

Related reference

[Interactive forms package](#) on page 665

The interactive forms package contains actions that handle exceptions encountered by a bot. All the actions performed by users on the interactive forms can be monitored to execute logic using subtasks.

Adding a trigger to run a bot

Add triggers that can automatically run the selected bot whenever a specific event occurs. For example, clicking a specific button or using a combination of keystrokes.

Triggers integrate predefined events into your workflow and reduce the number of repetitive tasks that users must perform. Attended automation in Enterprise A2019 enables you to create unique triggers for various applications. You can then use these triggers to start a bot.

Use one of the following types of triggers to start a bot:

Email

Starts a bot when a new email message is received in the specified email service such as Microsoft Outlook, Email server, or EWS server.

Files and folders

Starts a bot when a predefined file or folder event occurs. You can set one of the following options as the trigger:

- When a new file or folder is created.
- When an existing file or folder is deleted.
- When a file or folder is renamed.
- When a file or folder is modified.

Hot key

Starts a bot when a predefined combination of keystroke is performed on the keyboard. You can set a combination of the following keys as the trigger:

- Control keys such as Ctrl, Alt, Windows logo key, and Esc.
- Keys with regular alphabetical (English) characters.

Interface

Starts a bot when a predefined event occurs on the selected user interface element. Some of the events that you can set as trigger in Microsoft Windows are:

- When a process starts running.
- When a process stops running.
- When an application window opens.
- When an application window closes.



Note: When capturing an interface trigger in a SAP application, ensure that both the Recorder and Interface trigger packages are from Build 5933 or from a prior release.

Related reference

[Trigger loop package](#) on page 819

The Trigger loop package enables you to run a series of actions when a trigger event occurs. You can insert multiple trigger loops within a bot or nest one trigger loop within another trigger loop.

Add an email trigger

Use email triggers to start a bot when a new email message is received in a specified email service.

Connect the Enterprise Control Room to one of the email services on your system and trigger the bot when you receive a new email.

1. Click BOTS > My Bots > Create new > Bot.
2. Enter a name for the bot.
All the bots are stored under the \Bots folder. Click Browse to change the folder.
3. Click Create & edit.
4. In the bot builder page, click Triggers > Email trigger.
5. Drag Email into Drag a trigger here.
6. Use the Email trigger pane on the right to choose one of the following server types as the trigger for your incoming emails:

Server type	Steps
Microsoft Outlook	Click Outlook. Microsoft Outlook is set as the email service and the bot is triggered when you receive a new email.

Server type	Steps
Email server	Click Email server. - Enter the email service Host information. For example, if you are using Office365 as your email service, enter <code>Outlook.office365.com</code>. - Select IMAP or POP3. IMAP and POP3 are protocols used to connect to the mail server that enables you to read your emails through an email client. Note: The POP3 protocol has a known limitation where any new calendar invite can also trigger the bot. - Enter the configured port number for your email server. - Select one of the following user authentication methods to sign in to the email server: - Credential: Click Pick to select the stored Username and Password. Credentials and credential variables in the Bot editor on page 878 - Insecure string: Enter the username and password. Note: The Email in folder does not support sub-folders when you set the protocol as POP3 for Email Server,
EWS server	Click EWS server. - From the Microsoft Exchange Version drop-down menu, select your current version. For example, if you are using Microsoft Exchange Service Pack 2, select Exchange2010_SP2 as your email service. - Select one of the following user authentication methods to sign in to the email server: - Credential: Click Pick to select the stored Username and Password. Credentials and credential variables in the Bot editor on page 878 - Insecure string: Enter the username and password.

- Optional: Use the Check every drop-down menu available under all the server types to set the trigger interval.

The trigger interval for the bot is set to 120 seconds by default.

- Optional: Use Select Conditions to specify an email event for the selected server type.
Consider a scenario where you select Outlook and want to trigger a bot when you receive an email from a specific sender. In Select Conditions, select the Email from check box and specify the sender's email address.
- Click Apply.

- Click Run > Run with triggers.

Microsoft Outlook, Email server or EWS server is set as the trigger to start the bot for new emails.

Add a file and folder trigger

Use the files and folders trigger to start a bot when a predefined action such as create, delete, rename, or modify is performed on a file or a folder.

This procedure is for a scenario where you want to trigger a bot when a user modifies a spreadsheet called `Sales_update.xls`.

- Click BOTS > My Bots > Create new > Bot.
- Enter a name for the bot.
All the bots are stored under the `\Bots` folder. Click Browse to change the folder.
- Click Create & edit.
- In the bot builder page, click Triggers > Files & folders.
- Drag File trigger into Drag a trigger here.
- Click Browse and select the `Sales_update.xls` file.
- From the Start the bot when the file is drop-down menu, select modified.
This sets the trigger for the bot.
- Optional: Use the Assigned to drop-down menu to assign a variable.



Note: If you want use the Variables tab to create a variable, ensure you select the Use as input check box for it to appear under the Assigned to (optional) drop-down menu.



Note: If you use the  under the Assigned to (optional) drop-down menu to create a variable, ensure not to select the Constant (read only) check box.

The following set of data can be retrieved by defining a variable as the input type, which you can assign to get output from the trigger:

- triggerType: File or folder trigger
- eventType: The type of trigger event

The following set of data cannot be used if the Set Schema check box is selected as it returns a non-string variable type:

- timeStamp: The time when the trigger occurred.



Note: Ensure you link the timeStamp value to string variable to obtain the trigger data.

For example, consider you want to extract the date and time for the trigger event when a user modifies the `Sales_update.xls` file. Use the Message action within the task logic, and enter `Date Time- $recordVar[2]$` in the Enter the message to display field.

- fromFolder: Details of the parent folder path
- folder: Details of the file or folder path on which the event occurred

- Click Save.
- Click Run > Run with triggers.
Whenever a user modifies the `Sales_update.xls`, the bot is triggered.

Related reference

[Using event triggers](#) on page 1061

All the bots that have a preset or predefined event as a trigger are listed under the Event triggers tab.

Add a hot key trigger

Use the hot key trigger to start a bot when a predefined combination of keys is used on the keyboard.

This procedure is for a scenario where the bot triggered when a user presses Ctrl (plus) L keys from the keyboard.

1. Click BOTS > My Bots > Create new > Bot.
2. Enter a name for the bot.
All the bots are stored under the \Bots folder. Click Browse to change the folder.
3. Click Create & edit.
4. In the bot builder page, click Triggers > Hot key.
5. Drag Hot key trigger into Drag a trigger here.
6. Click Ctrl to set it as the Hot key from the available key modifiers.
7. Use the drop-down menu to select L from the keyboard.
The Hot key field displays the key combination that will trigger the bot.
8. Click Apply.
9. Click Run > Run with triggers.
When the Ctrl and L keys are used on the keyboard, the bot is triggered.

Add an interface trigger

Use interface triggers to start a bot when a predefined action occurs on a specific interface element, such as clicking a button or closing an application.

This procedure is for a scenario where you want to configure a trigger to start a bot when the user clicks the File in Microsoft Word. Ensure you have the Microsoft Word application open on your system.



Note: Interface triggers for objects are available only for native Windows applications.

1. Click BOTS > My Bots > Create new > Bot.
2. Enter a name for the bot.
All the bots are stored in the \Bots folder. Click Browse to change the folder.
3. Click Create & edit.
4. In the bot builder page, click Triggers > Interface trigger.
5. Drag Object into Drag a trigger here.
The Interface trigger: Object editing panel appears.
6. From the Window detail drop-down menu, select AVAILABLE WINDOWS > Word.
This sets the trigger for the bot. You must configure the action to start the bot. The Window title and Executable options are updated based on the window you select.
If Microsoft Word is not displayed in the list, you can use the Refresh option to reload the list of applications.
7. Click Capture object.
This initiates a built-in web recorder that captures the action. In this scenario, Microsoft Word is displayed. Click New, which is then set as the trigger to start the bot.
8. Click the Select main event drop-down menu to choose a specific event.

In this scenario, New in Microsoft Word is considered a button and the following events are available:

- Click: Triggers the bot when the user clicks the selected main event object.
 - Click with hotkey: Use one of the available key modifiers and select a key (alphabetical letters) from the drop-down menu. This combination is set as the hot key to trigger the bot.
- Optional: Select one of the available Control keys (Shift, Alt, Ctrl, Windows and AltGr) as an additional combination for the hot key to trigger the bot.
 - Click Save.
 - Click Run > Run with triggers.
The preset trigger is created, and the bot is triggered when the user clicks New in Microsoft Word.

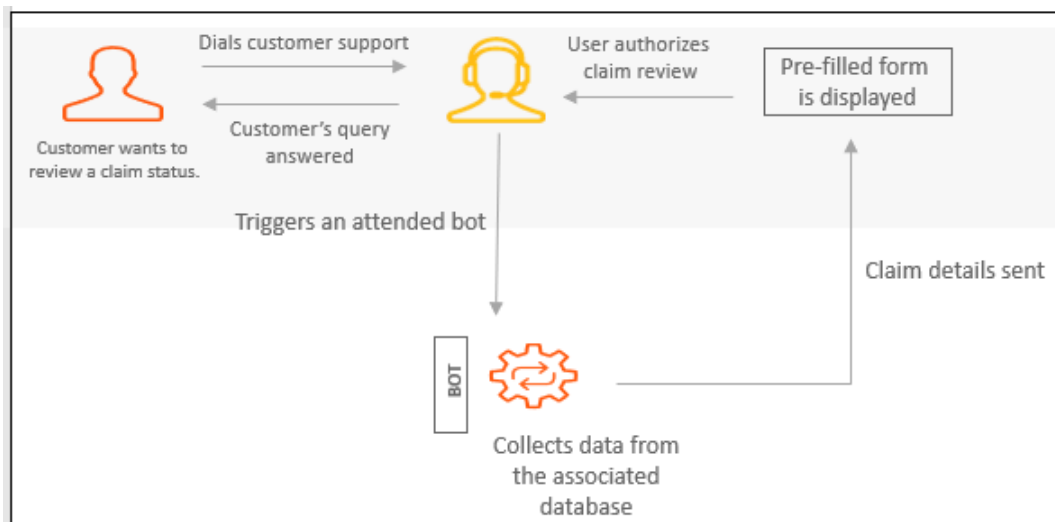
Example for using hot key to trigger a bot

In this example, a front desk executive of an insurance company responds to a call from an existing customer who wants to understand the policy details and its validity. The executive uses a hot key to trigger a bot that retrieves the customer's information.

Information about all the existing customers and the insurance company's various policies is distributed across two different databases. An existing bot maps the data between the two databases and provides consolidated information in a user readable format to the executive. Ctrl+L is set as the hot key to trigger this bot.

- The executive collects caller's information to verify if it is an existing customer.
The executive confirms the caller is an existing customer who wants to know the policy details.
- The executive uses Ctrl+L to trigger a bot.
The bot retrieves the customer information and the corresponding policy details. An authorization message is displayed.
- The executive reviews the information that is consolidated in a form, and answers the customer queries without any delay or hold time.

The following image illustrates this attended automation scenario:



Process Discovery using Discovery Bot

Use Discovery Bot to capture document processes, identify automation opportunities from business processes, prioritize opportunities based on ROI, and create bots automatically.

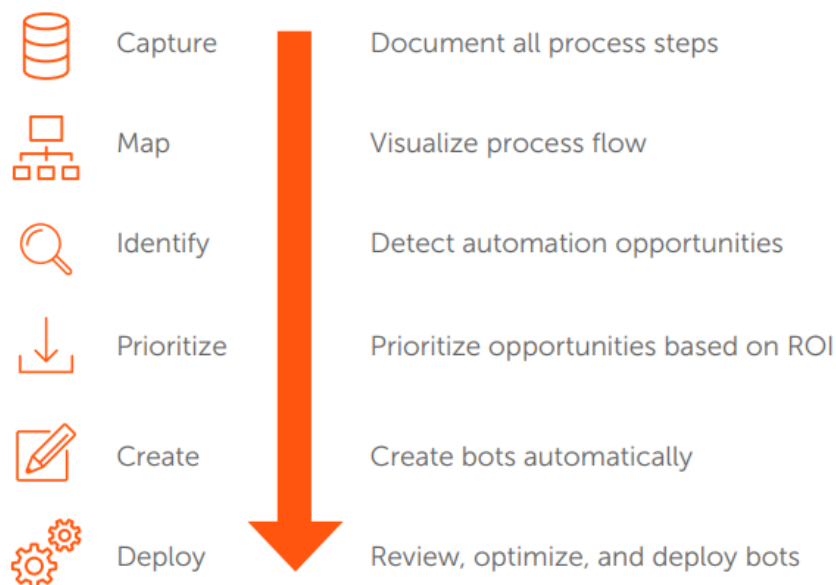
Intelligent automation begins with discovering and identifying patterns in business processes before RPA can begin. Process discovery solutions such as Discovery Bot align business workers to uncover automation opportunities that can optimize the return on your RPA investment.

Who uses Discovery Bot

Business specialists can use Discovery Bot to capture and annotate the steps they perform for a business process. The business analyst collects, visualizes, and analyzes the documented business processes to identify potential opportunities to convert to an automated process.

How Discovery Bot works

Discovery Bot enables users to record and document the steps of a business process, use visualizations and statistical data to identify automation opportunities, manage those opportunities, and convert them into automated business processes.



[Get started with Discovery Bot](#)

Get started with Discovery Bot

Discovery Bot enables organizations to accelerate the automation of business processes from process discovery to bot creation.

- Ensure the system requirements are met.
[Prerequisites for Discovery Bot](#) on page 954

- Install and configure Discovery Bot for users in your organization.

[Installing Enterprise Control Room On-Premises](#) on page 284

1. Set up users and assign Discovery Bot roles.

Assign Enterprise A2019 users with the relevant Discovery Bot permissions and associated licenses.

- [Discovery Bot users](#) on page 952
- [Supported licenses for Discovery Bot](#) on page 956
- [Create users for Discovery Bot](#) on page 959
 - [Create multi-role users for Discovery Bot](#) on page 960
 - [Create a custom role for Discovery Bot](#) on page 962
 - [Assign the Discovery Bot custom role to a user](#) on page 963

2. Set up the business process within your organization.

Create a placeholder for collecting all of the recordings associated for a given process. Invite one or more users through email notification to a Discovery Bot process recording session.

[Create a Discovery Bot process](#) on page 965

3. Record the process.

Business users record their work for the associated processes, annotate their steps, and submit for review for possible opportunities for automation.

- [Supported applications and browsers for Discovery Bot](#) on page 967
- [Record a Discovery Bot business process](#) on page 968

4. Analyze the process.

The relevant business users (subject matter experts (SMEs), RPM or business analysts (BA)) review the recordings for specific usage patterns.

- [Analyzing processes for automation](#) on page 972
- [Review and compare recording data](#) on page 974

5. Create opportunities. Merge specific recordings or steps as required.

[Create a process view with branches and opportunities](#) on page 976

6. Prioritize opportunities and generate bots automatically.

[Review opportunities and convert to bot](#) on page 983

Discovery Bot users

Various users are involved in the Discovery process, and each user's role and responsibility helps in identifying potential automation opportunities. The streamlined workflow in Discovery Bot enables various users to collaborate without changing their operations in a major way.

Discovering opportunities for automation involves the following users:

Enterprise Control Room administrator	Responsible for creating users and assigning roles and licenses for Discovery Bot.
Discovery Bot administrator	Manages the creation, deletion, and editing of processes, and the associating or disassociating of Discovery Bot users roles to one or more processes.

Discovery Bot analyst

Users with the Discovery Bot admin privileges cannot view the recording data of any process, participate in the recording analysis, or create new opportunities.

These users can also be known by other names in an organization such as process owner, process analyst, business analyst, or subject matter expert. The Discovery Bot analyst is responsible for reviewing the associated recordings and identifying potential candidates for automation. The analyst can do the following:

- View all approved recordings from assigned users for a given process.

The analyst cannot edit the recordings; however, they can merge the necessary variations from multiple recordings and create an aggregate view of the process.

- Create one or more opportunities from individual recordings and the aggregated view created from multiple recordings, and convert the opportunities into bots.
- Export an opportunity to a Word document.

While it is not a prerequisite for the analyst to have inherent knowledge of processes that are being reviewed, it is beneficial because this knowledge helps in easily selecting and analyzing the recordings.

Discovery Bot business user

Represents the task force in an organization that will benefit from process automations. The business user performs the associated tasks within one or more business processes.

- Capture one or more recordings of performing the assigned processes.

The user is responsible for recording the steps in the process that are being reviewed and evaluated for potential automation candidates.

- The user is invited to participate in one or more processes by the Discovery Bot administrator.
- Edit and annotate the recordings.

For each recording, the user can review the recorded screen captures and provide annotations to capture the business context for the analyst to review. The user can update the keyboard entered text field if the information should not be shared with the analyst (e.g. user ID and password). If the captured steps are not relevant to the process, the business user can delete the steps before submitting for review.



Note: After the recording has been submitted, it cannot be edited for making any further changes.

- Control the steps being recorder.

Users can start, pause, resume, and stop the recording on demand using the Discovery Bot recorder to capture the relevant steps for each process.



Note: After the recorder has been stopped, additional steps cannot be inserted into that recording.

Prerequisites for Discovery Bot

To use Discovery Bot for your enterprise business processes, you must have an Enterprise A2019 working environment and the associated dependencies installed: Bot agent, browser extension, and so on.

Supported Automation Anywhere Enterprise versions and server requirements

Verify that you have the correct Enterprise Control Room version installed. The Enterprise Control Room deployment can be cloud or on-premises.

Ensure your Enterprise Control Room server requirements are set up before installation.



Note: The minimum RAM required to support Discovery Bot functionality on your local machine is 4 GB.

See [Enterprise Control Room server requirements](#) on page 291..

System requirements

For Discovery Bot users' recording processes or assigned bot creation privileges, verify that your device meets the following system requirements:

- Windows machine is only supported for recording sessions.
- Set your local device credentials for any device that is connected to the Enterprise Control Room. This is a one-time setup for each device. Ensure each device that you use accepts the credentials in your profile.
- [Set user device credentials](#) on page 415
- Register your device and install the latest Bot agent version on your machine.
[Install Bot agent and register device](#) on page 400
- To record processes using Google Chrome, the Chrome plug-in must be installed.
[Supported browsers for Enterprise A2019](#) on page 307
- Ensure your environment is ready to begin recording and analyzing processes using the Discovery Bot recorder. The prerequisites are similar to the Universal Recorder.
[Record a task with the Universal Recorder](#) on page 838
- Verify the Discovery Bot recorder requirements are completed.

[Supported applications and browsers for Discovery Bot](#) on page 967

Installation requirements

The Discovery Bot installer is integrated with the Enterprise A2019 installer. No separate installation is required for Discovery Bot On-Premises users. The IT administrator in your organization performs this task. See [Installing Enterprise Control Room On-Premises](#) on page 284.



Note: Ensure your database server requirements are met before using SQL authentication mode to connect to the Enterprise Control Room: [Installing Enterprise Control Room using Custom mode](#) on page 330.

Verify installation

After the installation is complete, log in to your Enterprise Control Room as an administrator. The Discovery Bot tab is available for use from the left panel.

Process Discovery package

The Process Discovery package contains actions that record various object operations such as click (right or left), recording, and window resizing that are used during process recording sessions. Information about the Process Discovery package is available in the View package page.

The actions are not available for use from the Bot editor.

Upgrade Discovery Bot from Enterprise A2019.15 to later versions

Upgrade Discovery Bot from Enterprise A2019.15 (On-Premises) to a later version for the latest features and enhancements.

Enterprise A2019.15 provides a separate installer (executable file) for Discovery Bot On-Premises users to install and use Discovery Bot from the Enterprise Control Room. Starting from A2019.16, the Discovery Bot installer is integrated with the Enterprise A2019 installer. To upgrade from Enterprise A2019.15 to a later version, you must first uninstall Discovery Bot from your machine and install the Enterprise Control Room.

1. In your Windows device, go to Apps & features.
2. Search for Discovery Bot.
3. Click Uninstall.
4. Install the latest version of the Enterprise Control Room.
[Installing Enterprise Control Room On-Premises](#) on page 284
5. From your local machine, log in to your Enterprise Control Room as an administrator.
The Discovery Bot tab is available for use from the left panel.

Supported licenses for Discovery Bot

Learn about the supported Discovery Bot licenses to ensure business workers are ready to begin using Discovery Bot.

Process Discovery licenses must be purchased for use for business analysts and business users using Discovery Bot. Discovery Bot supports two licenses:

- Process analyzer license for the Discovery Bot analyst

This license allows a user to view and manage the metadata from all recordings within the process and create, view, and manage opportunities created from the recordings.

- Process recorder license for the Discovery Bot user

The process recorder license allows a user to view, record, and submit a process using the Discovery Bot recorder.

The following table displays detailed information for supported licenses and permissions for Discovery Bot business workers:

Discovery Bot user	System-provided Discovery Bot role	Discovery Bot features	Discovery Bot license required
Discovery Bot admin	AAE_Discovery Bot Admin	• Create, view, update, and delete processes. • Assign Discovery Bot analyst and business user to processes.	None
Discovery Bot analyst	AAE_Discovery Bot Analyst	View assigned processes.  Note: Assigned processes are only displayed after the processes are created by the Discovery Bot admin.	Process analyzer

Discovery Bot user	System-provided Discovery Bot role	Discovery Bot features	Discovery Bot license required
		View only recordings (including annotated steps and metadata) that they have created or been assigned to. An Analyst can also view recordings of other users in the process as long as they are in Approved state. If a user is no longer assigned to a process, the user will lose access to the recordings.	Process analyzer
		View all recordings (own and other users), including metadata and annotated steps, for a given process.	Process analyzer
		- Create, view, update, and delete manual generated aggregation - View all manually generated aggregations	Process analyzer
		Create and view own opportunities for a given process.	Process analyzer
		Convert an opportunity to a bot.	Process analyzer for opportunity creation. Bot Creator license is required to convert an opportunity to a bot.
		Export opportunity to Word.	Process analyzer

Discovery Bot user	System-provided Discovery Bot role	Discovery Bot features	Discovery Bot license required
Discovery Bot user	AAE_Discovery Bot User	- Using the Discovery Bot recorder, create or more recordings for an assigned business process. - Update own recording to include annotations for the steps. - Delete one or more steps from own recording before submission. - View only recordings (including annotated steps, keyboard entered text, and application type) that they have created or been assigned to. The user can update the keyboard entered text field if the information should not be shared with the analyst (e.g. user ID and password).  Note: Assigned processes are only displayed after the processes are created by the Discovery Bot admin. If a user is no longer assigned to a process recording, the user will lose access to the recording data.	Process recorder

Create users for Discovery Bot

Create the Discovery Bot admin, analyst, and users to begin using the Discovery Bot functionality for front-office and back-office business processes. The Enterprise Control Room admin creates these users and assigns the required system roles.

Ensure that you have purchased the necessary Discovery Bot licenses for your business users before you begin creating users: [Prerequisites for Discovery Bot](#) on page 954.

To use the Discovery Bot features, the user must be assigned the appropriate role and licenses.



Note: The Discovery Bot Admin role and permissions are distinct from the Enterprise Control Room Admin role. See [Discovery Bot users](#) on page 952.

1. From your local machine, log in to your Enterprise Control Room as administrator.
2. Go to Administration > Users.
3. Click Create user.

The icon is located at the top-right of the Users table.

The Create user page is displayed.

4. In the General Details section, enter the following user details:

Enable User	Select the check box so that the user can log in immediately.
Username	Enter a unique user name.
Description	Optional: Enter a description for the user.
First name	Optional: Enter the first name of the user.
Last name	Optional: Enter the last name of the user.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. Click the URL in the email to log in to the Enterprise Control Room and set up your credentials. All important Enterprise Control Room notifications will be sent to this email address.

5. In the Select Roles section, select one of the following roles from the Available roles column:

Discovery Bot user	Select this role
Admin	AAE_Discovery Bot Admin
Analyst	AAE_Basic and AAE_Discovery Bot Analyst
	Note: The AAE_Basic role is required to view or add actions to the bots.
Business user	AAE_Basic and AAE_Discovery Bot User
	Note: The AAE_Basic role is required to view or add actions to the bots created by the analyst.

6. Click the right arrow to move the role to the Selected column.
7. In the Allocate a device license to this user section, select the following:

Discovery Bot user	Action
Admin	Retain the default None for the user. This user only has access to the Enterprise Control Room.
Analyst	Assign the Bot Creator - Development license to this user.  Note: This license is required to convert an opportunity to a bot.
Business user	Retain the default None for the user. This user only has access to the Enterprise Control Room.

8. In the Allocate other types of licenses for this user section, select the following:

Discovery Bot user	Action
Admin	No license is required.
Analyst	Select the Process analyzer license.
Business user	Select the Process recorder license.

9. Click Create user.
The new user is displayed in the User table. If SMTP is enabled, an email will be sent to the new user inviting them to log in.

[Create a Discovery Bot process](#) on page 965

You can begin capturing business processes using Discovery Bot. Create a process and assign users to record and capture the process using the Discovery Bot recorder.

Create multi-role users for Discovery Bot

Create multi-role users when you want to combine system-generated Discovery Bot roles and licenses to provide additional functionality for your users. Depending on your business requirements, you can combine up to three Discovery Bot system-generated roles and two process discovery licenses.

Ensure that you have purchased the necessary Discovery Bot licenses for your business users:

[Prerequisites for Discovery Bot](#) on page 954.

To use the Discovery Bot features, the user must be assigned the appropriate role and licenses.



Note: The Discovery Bot Admin role and permissions are distinct from the Enterprise Control Room Admin role. See [Discovery Bot users](#) on page 952.

Multi-role users will see a different set of menu actions (vertical ellipsis icon) available on a tile for a process. These actions are different from the standard Discovery Bot user actions that are available on a tile for a process.

The following actions are available for multi-role users (Admin + Business user + Analyst) on a tile for a process:

Admin actions

- View process details
- Edit process details

Business user actions

- Delete process
- Start recording
The Start Recording icon is displayed on a tile for a process, or you can select start recording from the vertical ellipsis icon.
- Edit my recording

Analyst action

Analyze processes

1. From your local machine, log in to your Enterprise Control Room as administrator.
2. Go to Administration > Users.
3. Click Create user.

The icon is located at the top-right of the Users table.

The Create user page is displayed.

4. In the General Details section, enter the following user details:

Enable User	Select the check box so that the user can log in immediately.
Username	Enter a unique user name.
Description	Optional: Enter a description for the user.
First name	Optional: Enter the first name of the user.
Last name	Optional: Enter the last name of the user.
Password	Optional: Enter your password and confirm the password.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. Click the URL in the email to log in to the Enterprise Control Room and set up your credentials. All important Enterprise Control Room notifications will be sent to this email address.

5. In the Select Roles section, select the following roles from the Available roles column to create multi-role users:

Discovery Bot user	Select this role
Admin + Business user	AAE_Discovery Bot Admin and AAE_Discovery Bot User
Admin + Analyst	AAE_Basic, AAE_Discovery Bot Admin, and AAE_Discovery Bot Analyst
Business user + Analyst	AAE_Basic, AAE_Discovery Bot User, and AAE_Discovery Bot Analyst
Admin + Business user + Analyst	AAE_Basic, AAE_Discovery Bot Admin, AAE_Discovery Bot User, and AAE_Discovery Bot Analyst

6. Click the right arrow to move the roles to the Selected column.
7. In the Allocate a device license to this user section, select the following:

Discovery Bot user	Action
Admin + Business user	Retain the default None for the user. This user only has access to the Enterprise Control Room.
Admin + Analyst	Assign the Bot Creator - Development license to this user.  Note: This license is required to convert an opportunity to a bot.
Business user + Analyst	Assign the Bot Creator - Development license to this user.  Note: This license is required to convert an opportunity to a bot.
Admin + Business user + Analyst	Assign the Bot Creator - Development license to this user.  Note: This license is required to convert an opportunity to a bot.

8. In the Allocate other types of licenses for this user section, select the following:

Discovery Bot user	Action
Admin + Business user	Select the Process recorder license.
Admin + Analyst	Select the Process analyzer license.
Business user + Analyst	Select the Process analyzer and Process recorder licenses.
Admin + Business user + Analyst	Select the Process analyzer and Process recorder licenses.

9. Click Create user.
The new user is displayed in the User table. If SMTP is enabled, an email will be sent to the new user inviting them to log in.

[Create a Discovery Bot process](#) on page 965

Log in with your multi-role credentials and create a process. Assign users to record and capture the process using the Discovery Bot recorder. Review and analyze business processes.

Create a custom role for Discovery Bot

Learn how to create a Discovery Bot custom role that allows users to select Discovery Bot feature permissions from standard business user roles (Admin, Business user, or Analyst roles), and a single Enterprise Control Room admin feature permission for viewing users.

Ensure that you have purchased the necessary Discovery Bot licenses for your business users:
[Prerequisites for Discovery Bot](#) on page 954.

To use the Discovery Bot features, the user must be assigned the appropriate role and licenses.



Note: The Discovery Bot Admin role and permissions are distinct from the Enterprise Control Room Admin role. See [Discovery Bot users](#) on page 952.

Use case

The Discovery Bot custom role user is enabled with Enterprise Control Room Admin feature permissions for viewing users, but does not have edit permissions. The role allows the user to view and manage all Discovery Bot feature permissions for processes, recordings, aggregations, and opportunities. However, the role does not allow the user to view opportunities or the associated metadata created by other analysts in the Opportunities tab. The permission to view all opportunities is not enabled for the user.

1. From your local machine, log in to your Enterprise Control Room as administrator.
2. Go to Administration > Roles.
3. Click Create role.
The icon is located at the top-right of the All roles table.
The Create role page is displayed.
4. Enter a Role name, and optionally enter a Role description.
5. Scroll to the Administration section.
6. Select View users.
7. Select View roles.
8. Scroll to the Discovery Bot section.
9. Select View assigned process at the parent level.
The child-level permissions are enabled.
10. Select all the following feature permissions:
 - a) Discovery Bot process feature permissions at the child level
 - b) Discovery Bot recording feature permissions at the parent and child levels
 - c) Discovery Bot aggregation feature permissions at parent and child levels
 - d) Discovery Bot opportunity feature permissions at the parent and child levels



Note: Do not select View all opportunities.

11. Click Create role.
The Discovery Bot custom role is created.

[Assign the Discovery Bot custom role to a user](#) on page 963

Assign the Discovery Bot custom role to a user

Create a new user and assign the Discovery Bot custom role you created to the user.

Ensure that you have purchased the necessary Discovery Bot licenses for your business users: [Prerequisites for Discovery Bot](#) on page 954.

To use the Discovery Bot features, the user must be assigned the appropriate role and licenses.



Note: The Discovery Bot Admin role and permissions are distinct from the Enterprise Control Room Admin role. See [Discovery Bot users](#) on page 952.

Custom role users will see a different set of menu actions (vertical ellipsis icon) available on a tile for a process, depending on the permissions given to users. These actions are different from the standard Discovery Bot user actions that are available on a tile for a process.

For this custom role use case, the following actions are available on a tile for a process:

Admin actions

- View process details
- Edit process details
- Delete process

Business user actions

- Start recording
The Start Recording icon is displayed on a tile for a process, or you can select start recording from the vertical ellipsis icon.
- Edit my recording

Analyst action

Analyze processes

1. From your local machine, log in to your Enterprise Control Room as administrator.
2. Go to Administration > Users.
3. Click Create user.

The icon is located at the top-right of the Users table.

The Create user page is displayed.

4. In the General Details section, enter the following user details:

Enable User	Select the check box so that the user can log in immediately.
Username	Enter a unique user name.
Description	Optional: Enter a description for the user.
First name	Optional: Enter the first name of the user.
Last name	Optional: Enter the last name of the user.
Password	Optional: Enter your password and confirm the password.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. Click the URL in the email to log in to the Enterprise Control Room and set up your credentials. All important Enterprise Control Room notifications will be sent to this email address.

5. In the Select Roles section, select the AAE_Basic role and the Discovery Bot custom role you created from the Available roles column.
6. Click the right arrow to move the roles to the Selected column.
7. In the Allocate a device license to this user section, select the Bot Creator - Development license.
8. In the Allocate other types of licenses for this user section, select the Process analyzer and Process recorder licenses.

9. Click Create user.

The new user is displayed in the User table. If SMTP is enabled, an email will be sent to the new user inviting them to log in.

[Create a Discovery Bot process](#) on page 965

Log in with your custom role credentials and create a process. Assign users to record and capture the process using the Discovery Bot recorder. Review and analyze business processes.

Create a Discovery Bot process

Create a Discovery Bot process and assign users to record and analyze a process for your automation requirements.

- This task is performed by the Discovery Bot admin who manages the creation, deletion, and editing of Discovery Bot processes.



Note: Multi-role and custom role user can also perform this task depending on the roles or the permissions given to users. You will see a different set of menu actions (vertical ellipsis icon) available on a tile for a process.

- Ensure the Process recorder license is allocated to Discovery Bot users assigned to recording a process.
- Ensure the Process analyzer license is allocated to the Discovery Bot analyst assigned to analyzing a process.
- Create a process and assign users:
 - From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
 - Go to Discovery Bot > Processes.
 - Click Create Process.
The Create process page is displayed.
 - In the General Details tab, enter a Process Name .
Special characters are not supported. Creating a process with a duplicate name not supported.
 - Optional: Enter a Process Description.
 - Click Next to assign users to a process.
 - Optional: In the Users tab, select the Discovery Bot business user or analyst from the list of Available users.
 - Click the right arrow to move the roles to the list in the Selected column.
 - Click Create Process.
 - Click Next to view the invitation that is sent to users to begin recording processes.
 - Click Close to exit the page and return to the Processes page.



Note: An email invitation is sent to assigned users (new users or users added at a later time) to begin a Discovery Bot process recording session.

The newly created process is displayed in the Processes page on a tile.

For users, all of their assigned processes are available for viewing from the Processes page. The tile for a process displays the following information for an admin user:

Process tile	Description
Recordings	The number of the recordings captured and stored for a process by users.
Process Cycle	The average time, in minutes and seconds, across all recordings captured for a process.
Vertical ellipse icon (three dots)  Note: You might see a different set of menu actions available from the tile if you are a Discovery Bot standard user, multi-role user, or custom role user.	View, edit, or delete information for a process. - Click View process details to view more information about a process, edit and update information, and save changes. - Click Edit process details to edit a process. Enter your changes and click Save changes. Click Close to return to the Processes page.  Note: The name of the process cannot be changed. - Click Delete process to delete a process. A message window appears. - Click Yes, delete to delete a process. All recordings and associated data are permanently deleted. This cannot be undone. Click No, cancel to return to the Processes page.

- Create a process and add users at a later time:
 - From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
 - Go to Discovery Bot > Processes.
 - Click Create Process.
The Create process page is displayed.
 - In the General Details tab, enter a Process Name.
Special characters are not supported. Creating a process with a name previously used for another process is not supported.
 - Optional: Enter a Process Description.
 - Click Create Process to create a process without assigning users.
 - Click Close to exit the page and return to the Processes page.
- Update an existing process and add users.
 - From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
 - Go to Discovery Bot > Processes.

- c) Go to the process you want to edit.
- d) Click Edit from the Options icon.
- e) In the Edit process page, click Next to assign users to a process.
- f) In the Users tab, select the Discovery Bot business user or analyst from the list of Available users.
- g) Click the right arrow to move the roles to the list in the Selected column.
- h) Click Save changes.
- i) Click Next to view the invitation that is sent to users to begin recording processes.
- j) Click Close to exit the page and return to the Processes page.



Note: An email invitation is sent to assigned users (new users or users added at a later time) to begin a Discovery Bot process recording session.

The newly created process is displayed in the Processes page on a tile.

[Record a Discovery Bot business process](#) on page 968

Log in to your Enterprise Control Room as a Discovery Bot user and record a business process assigned to you.

Supported applications and browsers for Discovery Bot

Learn about supported applications and browsers to ensure your environment is ready before you begin using the Discovery Bot recorder.

About the Discovery Bot recorder

The Discovery Bot recorder is similar in function to the Enterprise A2019 Universal Recorder with one significant difference: pre-selection of the application to be used for recording is not required.

The Discovery Bot recorder captures data across many user interface (UI) objects such as Windows applications, native applications, executable file, or browser window on PC devices and machines or virtual machines running Windows OS. Use the Discovery Bot recorder to capture, read (data extraction), write (data entry), and click (left or right) operations when working across various operations. A single recording can capture up to 8 hours of user actions.

The Discovery Bot recorder allows you to highlight text for read and write applications, for example, highlighting a text field in Excel. You can highlight where you click or enter data with a red highlighted box shown when using the Universal Recorder. Click the object control, for example, a button, form field, or a table. You can perform actions like, double-click, drag-drop, and click and hold while recording however, these actions are not captured and displayed by the recorder in the screenshot view. Text selection using right-click or Ctrl+ C and paste is captured and displayed by the recorder in the screenshot view. A red outline highlights the control when you move the mouse over it to capture the action. The red outline indicates that the recorder is ready for you to take the next action in recording the process.

Supported applications and browsers

The recorder supports system, web, and virtual applications including the following:

Applications

- Microsoft applications: Edge, PowerPoint, Excel, Word, Outlook, Calculator, Notepad, Notepad+, Teams
- Zoom
- Snagit
- Java applet, web start, and desktop applications that run using Java Runtime Environment (JRE) 6, 7, 8, 9, 10, and 11 (32-bit and 64-bit versions)
- Microsoft Active Accessibility and UI automation based applications
- Oracle EBS and Forms
- SAP 730, 740, 750 and 760 versions.
- Citrix Virtual Apps

Browsers

- Internet Explorer version 11
- Google Chrome



Note: Chrome plug-in must be installed to record processes. If the Chrome plug-in is removed, you must manually add and re-enable the plug-in. [Google Chrome browser extension requirements](#) on page 308

Desktop

The desktop refers to the device screen when all application and browser windows are minimized.

Taskbar

The taskbar is the horizontal or vertical bar containing icons of open applications and browsers, as well as the notification area. You can capture application, browser, system, and other icons, for example such as the clock and calendar, volume, and Wi-Fi.

Record a Discovery Bot business process

Record, capture, and annotate steps for a business process using the Discovery Bot recorder. The process recording allows the Discovery Bot analyst to view all recorded steps for a quantitative and comparative analysis. The steps along with the captured metadata and user actions help the analyst make the decision to create opportunities and bots.

- This task is performed by the Discovery Bot user who records assigned business processes and submits the same for review and analysis.



Note: Multi-role and custom role user can also perform this task depending on the roles or the permissions given to users. You will see a different set of menu actions (vertical ellipsis icon) available on a tile for a process.

- Ensure that you have set your device credentials and installed the latest Bot agent version on your machine before using the Discovery Bot recorder.
- Ensure that the machine on which you will be performing the recordings is also duly registered.

[Prerequisites for Discovery Bot](#) on page 954

1. Record a business process:

- From your local machine, log in to your Enterprise Control Room as Discovery Bot business user.
- Go to Discovery Bot > Processes.
The Processes page appears, displaying all processes assigned to the user for recording.
- Click the Start Recording icon from the tile associated with the process you want to begin recording a process.



Note: You can also select, Start Recording from the from the vertical ellipse icon to begin recording a process.

The Discovery Bot Recorder window is displayed with Pause and Stop options. Pause and resume the recording as required. Allow for a few minutes for the recorder to start the very first time you begin recording a process.

- Perform the actions to record.

For example, open an application and fill in a form or open a browser and search a website. Click the object control, for example, a button, form field, or a table. You can perform actions like, double-click, drag-drop, and click and hold while recording, however, these actions are not captured and displayed by the recorder in the screenshot view. Text selection using right-click or Ctrl+ C and paste is captured and displayed by the recorder in the screenshot view. A red outline highlights the control when you move the mouse over it to capture the action. The red outline indicates that the recorder is ready for you to take the next action in recording the process.

- Click Stop to end the recording.

You can click Cancel recording to cancel a recording at any time.

Wait for a few seconds for the recorder to end. The details in the tile for the process is incremented to include the new recording in the Recordings section.



Note: Once the recording has been stopped, additional steps cannot be added to the recording.



Note: A maximum of 8 hours worth of user actions can be captured in a single recording.

2. Review the captured steps, annotate, and submit a process recording for review to the Discovery Bot analyst:

- From Processes, click a process by clicking the process name or anywhere within the process tile body.

For Discovery Bot multi-role and custom role users, click the vertical ellipsis icon and select Edit my recording to edit and review recordings. If you click the process tile body or the process name, the View process page appears. Only approved recordings are displayed for the analyst on the View process page.

The Recordings page appears with the Recordings table on the left and single recording details on the right. The table displays the following information:

Recordings	Description
Recordings (#) (# selected)	The number of recordings logged in by users.
Customize columns	Click the table icon to display or hide columns (ID, Status, Process Cycle, and Recorder), or edit the layout of the header rows to display right or left as required.
ID	The ID number of the recording in the database. The system collects and sequentially increments the index for each recording captured by the users.  Note: To search for a specific recording, select ID and enter the ID number in the search bar.
Status	The status of the recording: • Pending: Initial state. • Approved: All user-required edits have been completed and recording is ready for review by an analyst. • Error: There is an error when storing the recording in the system. • Declined: Currently not being used.  Note: To search on a process status, select Status and choose a status from the drop-down list.
Process Cycle	The recording duration, in minutes and seconds, excluding the time that the recorder was paused.
Recorder	The name of the user that created the recording.  Note: To search on users assigned to a recording, select Recorder from the drop-down list and enter the user name in the search bar. The search is case-sensitive.

3. In the Recordings table, select the ID to view all captured steps. In the right pane, the header displays the recording ID details, including the total steps captured during the recording session.

Each recorded step includes: screenshot image with the Screen option (icon), application type, data (keyboard entered text), and step description (annotated user text) fields.

4. Optional: Click the Screen icon to display or hide the screenshot image.

Use the Screen option icon when you do not want to share personal image details with the Discovery Bot analyst, multi-role, or custom role users. To remove personal information, for example username and password credentials from the image, edit the Data field prior to submission for analyst review.



Note: If you hide an image and Click Submit, you cannot display the image again.

5. Click the screenshot to display the image in full size.

The Screenshot field shows the state of the application at the time of performing the associated action. You cannot edit this field. Click the image when you want to review the step action in more detail. For actions not captured by the recorder such as double-click, drag-drop, and click and hold, you can document the individual steps in the Step description field for the analyst.

The duration of the recorded step is displayed in minutes and seconds below the screenshot.

Use this information to help prioritize what step or sequence of steps are a better candidate for automation. For example, if a sequence of steps takes longer to perform, you can automate this first for a process to save manual effort.

- Click the Hide image icon to hide the image.

The image will not be submitted to the analyst for review. Click X to close the frame. Click Save to save your selection.

- Click Show image to display the image.

The image will be submitted to the analyst for review. Click X to close the frame. Click Save to save your selection.

6. Optional: Update the application name used in the process recording in the Application text field.

The Application field represents the name of the application on which the action was performed. If required, the user that made the recording can change this.

7. Optional: Update the keyboard entered text used in the process recording in the Data text field.

The Data field represents any data entered by the user at that step during the recording.



Note: You must follow the keyboard data entry with a left or right mouse click. For any step in which the data was entered, you can make changes to the data in the Data field. You cannot enter any data for steps which do not have any data entered during the actual recording of the process.

8. Optional: Update the context associated with the step in the Step description text field.

The Step description text field represents any additional description that you would like to provide regarding the operation being performed. The maximum character limit is 2000.

9. Optional: Delete any step that is not required to be included in the process recording.

10. Repeat the above steps for each step as required.

11. Optional: Click Save to save your changes.

Use the Save option when you want to edit and compare the recording data (including application, keyboard entered text, and annotation text fields) across multiple recordings captured in the Recordings table.

12. Click Submit.

The recording is submitted to the analyst for review and approval.



Note: After a recording is submitted, it cannot be edited to make additional changes.

[Analyzing processes for automation](#) on page 972

Log in to your Enterprise Control Room as a Discovery Bot analyst to review and analyze the recordings to create opportunities or bots as required.

Analyzing processes for automation

Review and analyze data from the Dashboard tab, create views from a starter recording in the Aggregated tab view, and add steps from one or more recordings to another recording to create a variant (branch). Compare up to three views, three recordings, or combine views and recordings side by side simultaneously.

Dashboard tab

The Dashboard tab provides a snapshot of a view or a recording data captured by all users for an assigned process. The following data is displayed in the Dashboard header:

Field	Description
Participants	Totally number of users that have submitted recordings for the process.
Process cycle	The average duration of the recordings provided for the process.
RPA opportunity	The number of the opportunities that include the selected recordings.
Applications involved	The totally number of applications used in a recording session by all assigned users.
Bots involved	The number of bots created from the selected recordings.

Application usage

The doughnut chart displays the number of applications used across selected recordings or views. The application usage details are displayed in the table to the right of the chart in the following format: Application | minutes seconds | percentage. The percentage represents the percent of the application used over a total of all applications used.

Use case

Use this information to quickly understand user participation and process complexity and variability; the higher the application count, the higher the complexity and variability of the process that is being analyzed. The average process cycle time will provide a quick insight into the duration of the process within the expected processing time. If the actual process cycle is higher across application count, this might be an indicator that the process is a more suitable candidate for automation and assists with improving efficiency.

Process cycle by recorder

The graph displays the time associated with the average process cycle (in minutes) grouped by users for all the selected recordings.

Use case

Use this information to compare the average recording time for each participant. For example, an analyst can learn why a recording session took longer or was completed in a shorter period for one particular participant and compare this information with other participants. This information is instrumental in narrowing down on a smaller subset of the recordings to study them for inefficiencies that might result in better or more opportunities for automation.

Recordings comparison

The graph displays the recording ID on the x-axis and the recording time on the y-axis across all selected recordings or a view from the table.

Use case

Use this information to quickly determine and compare a particular recording against other recordings in a process based on the duration of the recording. For example, you can select 10 recordings in the Recordings table and note that one particular recording is taking five times longer compared to the other recordings. By filtering on that one recording ID, you can see how the other recordings compare against each other. This information can later be used to identify the essential steps to create an opportunity. An alternative to using the chart is to sort the Recordings table using the Process cycle column in ascending or descending order.

Aggregated tab

The Aggregated tab provides an end-to-end view of the complete recording as a series of steps. Multiple continuous steps performed in the same application are automatically collated and displayed as a group to improve the readability of the process. Selecting a step opens the Preview pane (if hidden) and displays additional information about the step along with its screenshot. The aggregated view also provides you the ability to combine steps from multiple recordings into a view. This is also the section from where opportunities can be created from recordings and views.



Note: An opportunity can only be created from a single recording or a single view at one time.

Use case: Reviewing the credit score for loan processing from the Aggregated tab:

- View steps from a single recording
- Review step details from the recording individually
- Create views of your process workflow by combining steps multiple recordings
- Combine steps from different recordings, create a branch in the view and add steps from the additional recording
- Create any number of branches within a view where each branch represents one set of value for the underlying condition.
 - For example, for a loan with a credit of score less than 200, there might be one set of steps to follow and for higher score there might be a different branch where the other set of steps are being followed.
 - In the above example, the condition is credit score and the condition values are less than 200 for one branch and greater than or equal to 200 for the other branch, or greater than 200 and equal to 200 for two additional branches.

- Add steps from a single recording with steps from one or more recordings into a branch.
- Add steps from another recording into a new branch to the view. Drag and drop steps from a recording into a new branch in the view.
- Review views created by other users within the process.
- Create copies of views and make modifications as necessary.

Comparison tab

Compare up to three views, three recordings, or combine views and recordings side by side simultaneously. You cannot edit in this flow. You can only display recordings, views, or recordings and views.

Use case

The Comparison tab enables you to quickly see which recordings follow the expected or understood process. By selecting multiple recordings, you can display the following:

- How the steps might be completely different across the recordings
- The different number of steps within the grouping of the same application
- The difference in the sequence of steps
- The different types of applications being used in the recording session

Comparing multiple recordings enables you to understand how and where the use of bots can automate these steps, resulting in a more streamlined, efficient process.

Review and compare recording data

Learn how to review and analyze data from the Comparison view in Discovery Bot. You can view data by selecting up to three views, three recordings, or combine views and recordings side by side simultaneously.

- This task is performed by the Discovery Bot analyst who is in charge of reviewing and analyzing the associated recordings for business processes.
- Ensure the user is assigned the AAE_Discovery Bot Analyst role and process analyzer license.

[Supported licenses for Discovery Bot](#) on page 956

1. Review and analyze recordings in the Dashboard view:
 - a) From your local machine, log in to your Enterprise Control Room as Discovery Bot analyst.
 - b) Go to Discovery Bot > Processes.
The Processes page appears, displaying all assigned processes available for an analyst to review.
 - c) Select a process to review.
By default, the first time a process is selected for review, the Dashboard tab appears. You can select a view or a recording and display data from the Dashboard tab.

If you select a specific tab (Dashboard, Aggregated, or Comparison tab) and log out of the Enterprise Control Room, the last active tab that was selected appears when you log back into the Enterprise Control Room.
2. Click the Comparison tab to view and compare views, recordings, or a combination of views and recordings.
The initial screen is displayed with no views or recordings selected.
3. Compare up to three Aggregated views.

You can compare a minimum of two views or two recordings, or a combination of views and recordings. The maximum allowed is three views, three recordings, or a combination of views and recordings.

- a) Mouse over the actions menu in the Views table.
- b) Click the + (plus) sign from the row-level toolbar to add views.
The aggregated view is displayed.
- c) Click the - (minus) sign from the row-level toolbar to remove views.
If there are only two views or two recordings, or a combination of views and recordings displayed, then removing one entry will default the display to the initial view. The initial screen appears with no views or recordings selected.
The aggregated view is removed.
- d) Repeat the steps to display a maximum of three views to compare.
By default, you must select up to two views or two recordings, or a combination of views and recordings for the data to be displayed in the Comparison view.
- e) Use the Reset, Zoom in, or Zoom out options as required.
These options can be used individually per column for a view or recording.
- f) Use the screenshot icon or application icon in the toggle view (upper-right corner of the Comparison view) to decide how you want to display the steps.
The screenshot icon or application icon view affects all columns in the Comparison view.

4. Compare up to three recordings.

You can compare a minimum of two views or two recordings, or a combination of views and recordings. The maximum allowed is three views, three recordings, or a combination of views and recordings.

- a) Mouse over the actions menu in the Recordings table.
- b) Click the + (plus) sign from the row-level toolbar to add recordings.
The recording is displayed.
- c) Click the - (minus) sign from the row-level toolbar to remove recordings.
If there are only two views or two recordings, or a combination of views and recordings displayed, then removing one entry will default the display to the initial view. The initial screen appears with no views or recordings selected.
The recording is removed.
- d) Repeat the steps to display a maximum of three recordings to compare.
By default, you must select up to two views or two recordings, or a combination of views and recordings for the data to be displayed in the Comparison view.
- e) Use the Reset, Zoom in, or Zoom out options as required.
These options can be used individually per column for a view or recording.
- f) Use the screenshot icon or application icon in the toggle view (upper-right corner of the Comparison view) to decide how you want to display the steps.
The screenshot icon or application icon view affects all columns in the Comparison view.

[Create a process view with branches and opportunities](#) on page 976

Create a consolidated view of your business process, review recordings, and create a branch. Create potential opportunities.

Create a process view with branches and opportunities

Create a consolidated view of your business process and select steps to create potential opportunities for automation. Learn how to create a branch, merge steps into the branch, and create opportunities.

- This task is performed by the Discovery Bot analyst who is in charge of reviewing and analyzing the associated recordings for business processes.



Note: Multi-role and custom role user can also perform this task depending on your assigned permissions. You will see a different set of menu actions (vertical ellipsis icon) available on a tile for a process.

- Ensure the user is assigned the AAE_Discovery Bot Analyst role and process analyzer license.

[Supported licenses for Discovery Bot](#) on page 956

- Display a view or recording, select steps, and create an opportunity in a linear workflow in the Aggregated tab:
 - Select a process from the processes page.
The last active tab automatically opens.
 - Click the Aggregated tab.
By default, the selected view is displayed in the Aggregated tab main screen. In the Recordings table, the check boxes that are selected indicate the recordings included in the view. To select a single recording when a view is displayed, toggle off the selected view from the Views table. In the Recordings table, clear the check box for the selected recording that is enabled.

By default, if a view is not selected, all recordings are selected in the Recordings table. To select a single recording, click the Select all check box to clear all recordings. Select a recording for display in the Aggregated tab main screen.
 - Select either the screenshot icon or application icon in the toggle view (upper-right corner of the Aggregated tab view) to decide how you want to display the steps.
Contiguous steps performed in the same application are combined together. This is displayed as a single group to allow better readability of the process. The number of steps collated together is indicated in the bottom-right corner of the group.



Note: If the screenshot view is the last active view then the image of the last step in the group is the one that is displayed for the collapsed group. You can drag the process within the canvas by holding the down the mouse left button and moving the process to the desired location.

Use the Zoom in, or Zoom out options as required. Use the Reset zoom to bring the view back to the default level and re-center the process in the canvas.

- Click a single aggregated step or click the + (plus) sign to expand a group of steps to preview the step in more detail.
Click the - (minus) sign to collapse the steps. This information is helpful in deciding what steps to use to create a potential opportunity.

Click on the individual step to display details about the step in the Preview window on the right of the Aggregated view. The information is displayed in the following order:

Field	Description
Application name	The application type used during the recording. A screenshot is displayed. The Application field is displayed after the Step ID field.
Step Title	The step title can be the PNG name or tab name determined by the system.
List of recordings in this workflow	The recording ID associated with the step.
Step ID	The internal ID associated with the recording for back-end processing.
Data	The data entered by a user through the keyboard.
Action Type	The action type can right-click or left-click.
Time on step	The duration of the recorded step in minutes and seconds.

- e) Select the check box to the left of the step to create a potential opportunity.
The Opportunities details window displays the following information:

Field	Description
Steps	The number of steps selected by the user. This field increments each time a user checks the box to select a step and create a potential opportunity.
Select all steps	Allows you to select all steps, including branches, displayed in the view to create an opportunity. Select a group of steps/branches/loops From the canvas view, select the check box next to a branch, loop, or group to select all steps within that group, branch, or loop. If you select a nested branch or loop, the parent branch or loop displays a partial selection. Custom selection of steps Use the shift key to select a certain number of steps within a path from the main canvas. Cross path selection is not available
Average time	The duration, in minutes and seconds format, of the selected steps in the opportunity.

Field	Description
Variant	The number of branches included in the opportunity.

- f) Enter a name for the opportunity.
- g) Enter the average cost associated with the opportunity.
This is your best assessment of what it costs to perform the steps included in the opportunity.
- h) Enter the potential saving associated with the opportunity.
This is your best assessment of the expected savings on an annual basis, if a bot is used to perform all the steps in the opportunity.



Note: The potential savings must be larger than the average cost estimate.

- i) Select from High, Medium, or Low as the priority associated with the opportunity.
 - j) Click Create opportunity.
A message window appears notifying you that the opportunity is created. Click the hyperlink to view the newly created opportunity from the Opportunity tab in the Enterprise Control Room.
 - k) To create another opportunity from the same recording, click Unselect all to clear all the previously selected steps or change the selection as required, provide the details (name, cost, savings and priority).
 - l) Click Create opportunity.
Multiple opportunities can be created with same name – each one has a new id.
2. Create a view for your workflow process from the Aggregated view:
- a) With one or more recordings preselected in the Aggregated view, click Create view to create a view from the open recording.
Creating a view enables you to combine steps from multiple recordings to give you a more complete view of the entire process represented by the recordings.
 - b) Enter a name for the view in the Title field.
 - c) Optional: Enter a description.
 - d) Click Create.
The Create option is now updated to display Save view options from the drop-down. Use Save as to create a copy of the newly-created view. Use Save as [manual] to convert the system generated view to a manual view.
Create any number of views as required. To create a new view, toggle off the selected view from the Views table. Use the arrows to open and collapse the Views and Recordings table. Use the pagination to scroll through your saved views.
The system generated view now displays a loop, or a sequence of steps that occur for specific number of times for a single recording. The loop icon is displayed as an orange circle with an arrow. The loop icon has a for condition displayed under this along with a Count, which describes the number of times the sequence of steps in this loop is repeated in the process. You can change the loop condition (for and while) by saving the view as a manual view.
The system generated view is displayed in the Aggregated view main screen. In the Views table, the system generated view is indicated by the aggregate icon in the Type column. In the Recordings table, the check box is selected to indicate the recordings already included in the view. By default, the table is collapsed and the Recordings table is expanded when a view is created for the first time. The Recordings table returns to the first pagination. You are now ready to add recordings and branch, if required.

- e) Select the Model option when you want to compare and find the best aggregated view for your recordings. Use this option to save as many views with different combinations as needed. You can also save the view as a manual view to further customize your view and compare side by side. Select from an Easy or Strict model that will allow you to view the recordings where the steps are the same vs. recordings with different results with more branches in the process path. By default, the Easy option is selected. To save your selections before you toggle off a view to another view, click Save view. The changes are saved across the Dashboard, Aggregated, and Comparison tabs. If you do not save your changes, the filter resets. You must re-select and apply your options again. Click Model to select from the following options for display from the Aggregated tab:

The Model window displays the following:

Option	Action
Easy	Select Easy when you expect most of the recordings for a given process to be same. This results in less branching across selected views and recordings. You will expect to see two steps merged because there is less variance across the recordings.  Tip: Click Select all steps. The total number of steps displayed is less than the number of steps displayed when using the Strict option. There are less steps with the Easy option because most of the steps across selected recordings are the same.
Strict	Select Strict when you expect to see different results for a given process. This results in more branching across selected views and recordings.
Include data	Select Include data to include keyboard entered data used during the recording session. This information is displayed from the Preview window.
Include description	Select Include description to include any annotations provided by the Discovery Bot user. This information is displayed from the Preview window.
Reset	Click Reset to reset your selected options and reapply. By default, this resets to the Easy option.
Apply	Click Apply to apply your selected options for display from the Aggregated tab for the system generated or manual view.

- f) Select the Filter option when you want to use a set of values to compare the different sections of a process across various recordings by selecting a specific path and step filter. Used in conjunction with the Model option, the path and step filter options for a system-generated or manual view can help you to determine and decide on a good candidate for automation. To save your selections before you toggle off a view to another view, click Save view. The changes are saved across the Dashboard, Aggregated, and Comparison tabs. If you do not save your changes, the filter resets. You must re-select and apply your options again. For a manual view, you must re-select your filter options to create an opportunity. Click Filter and select from the following options:

The Filter window displays the following:

Option	Action
Path: With the most common flow	Select this option when you want to see what paths have the most common variance of a process that being used. If you choose to automate this type of path, you will have a higher return on your investment.
Path: With the most deviations	Select this option when you want to see certain sections of the process that have a different deviation in the path. The automation priority for such paths are usually low.
Path: With the most repetitive flow	Select this option when you want to display sections of the process that are more repetitive and cost more. The automation priority for such paths are usually high.
Step: Application	Select the Application option when you want to see the application type used during the recording. Use this option to see which applications are more frequently used, and to decide on which applications should be a priority.
Step: Action Type	Select the Action type option to filter the process steps to display only particular actions that will help you get an idea how the steps are used.
Clear	Select Clear to clear all selected options.
Reset	Select Reset to reset to the previous saved state of the filters in a view.
Apply	Select Apply to apply the selected options for display from the Aggregated tab for the system generated view or manual view.

- g) Select the Toggle frequency counter option to display the number of recordings that a particular path takes in the flow in a system generated view. Use this option to help you understand the

frequency of the path as compared to other recordings or views. This option can only be used for system generated views. In the Recordings table, select two or more recordings and the Toggle frequency counter displays two at the start of the process flow to indicate the number of recordings selected. If each recording takes a different path, the process flow is divided between the total number of recordings selected and displays accordingly. For example, if there are ten recordings in a view and three paths displayed. Two recordings follow one path, two recordings follow the second path, and six recordings follow the third path. Along the path flow, you will see two, two, and six. If a step is merged, the number gets added between the two paths. Use the thick or thinness of the path to help you prioritize processes for automation. The most commonly used path is the thickest path and this can be useful for prioritizing a process when reviewing many recordings. For example, if there are 5 paths for 20 recordings, you will quickly see which is the thickest and consider automating this path. If you have additional bandwidth to automate another path, you can drill down in the flow and look at the numbers to see what path is next as a possible candidate for automation.

- h) Mouse over the actions menu option in the Views table to copy, convert to manual, or delete a view.

The menu option is the vertical ellipsis (three dots). The vertical ellipsis only shows if the row level menu is hidden. You can configure the menu option to display as you want using the Customize columns icon. The menu option allows you to select from one of the following:

Option	Action
Copy	Select Copy to create a copy of the view. The newly created copied view is displayed in the Aggregated view and saved in the Views table with a new ID.
Convert to Manual	Select Convert to Manual to convert the system generated view to a manual view. This option allows you to add more recordings or steps from other recordings using the Edit option. Repeat steps 2a and 2b. Click Save. In the Views table, the manual view is indicated by the definition icon in the Type column. The newly created manual view is displayed in the Aggregated view main screen. In the Recordings table, the check box is selected to indicate the recordings already included in the view.
Edit	Select Edit to add recordings or steps from other recordings from the Recordings table.
Delete	Select Delete to delete the view. The underlying recordings used in the view are not impacted by the deletion of the view.

3. Create a new view from selected recordings, or select a manual view to add more steps from another recording to the process view. Create a branch, and merge steps from one or more recordings into the branch. Create opportunities.

In this example, a branch is created for reviewing the credit score for a bank loan.

- Click Create view or select a manual view from the Views table.
- Mouse over the row level menu in the Views table and click Edit.
- Mouse over the row level menu in the Recordings table and click the + sign to select a recording to display in the manual view.
The selected recording is displayed in new feeder canvas to the right of the main canvas in the Aggregated view.

Click on the individual step to display details about the step in the View details window on the right of the Aggregated view. The information is displayed in the following order:

Field	Description
Copy of	The copy of the view (view ID) that the view is copied from. The view ID is in shown in the Views table.
List of recordings	The list of recording(s) that are used in this view.
View name	The name of the view created.
Description	The description entered when you create a view.

- d) Click the branch icon in Aggregated workflow.

Click the branch icon to add a condition step into the view. Move the subsequent step into a branch on the left and adding a new branch to the right in the empty branch are to receive steps from another recording. In the upper-right corner of the yellow box, click the three dots to create a new branch or delete a branch. The branch endpoint is displayed with a small circle.

By default, you can move the branch endpoint lower in the path flow to include more than one step. To move the branch endpoint, press down with the cursor on the endpoint until you see the dotted lines appear around the branches. Drag the endpoint downward in the path flow. Place the endpoint when you see the dotted lines appear between the arrow. The endpoint is shifted downwards in the path flow and includes more steps.



Note: Moving the branch endpoint up in the branch is now supported.

- e) Click the Condition field at the node level.
- f) In the Condition field, enter a name for the condition. Example, `credit score`.
- g) Click the check mark to save the name for the condition.
- h) Open the respective branches on the right and left and set a value for the condition. For example, enter less than 200 on the right and greater than 700 on the left.
- i) Drag and drop steps from the recording in the feeder canvas into the receiver step that reads `Drag items here` of the branch in the main canvas. Use the Shift key to select one or more steps to drag into the receiver step. To clear a condition in the branch, click the three dots. Select Clear branch.
- j) Repeat the steps c through h to create additional branches and merge steps into the branch.
- k) Click Save to save the view and exit the Edit mode.
- l) Repeat steps a through j to create additional views and branches, as needed.
- The view or recording that is visible in the main canvas is displayed in bold in the respective Views or Recordings table.
- You can click the X (close) sign to exit the mode. Click Dismiss Changes to not save the view. All the selected steps will be deleted. This message is only shown when there are unsaved changes.
- m) Select the check box next to the steps in the view and create opportunities. Selecting the check box next to the condition box will select all the branches and the associated step into the opportunity. The Opportunity details tab appears.

- n) Fill in the necessary opportunity details and click Create Opportunity.

[Review opportunities and convert to bot](#) on page 983

You are now ready to review and finalize on your potential opportunities. Convert an opportunity to a bot. You can export the data to a Word document for your reference.

Review opportunities and convert to bot

Review potential opportunities, create opportunities from opportunities, and convert them to bots. You can also export the opportunity data to a Word document.

- This task is performed by the Discovery Bot analyst who is in charge of reviewing and analyzing the associated recordings of business processes.
- Ensure the analyst is assigned a Process analyzer license and the AAE_Discovery Bot Analyst role before processes are analyzed.

[Supported licenses for Discovery Bot](#) on page 956

- Ensure the analyst is assigned a Bot Creator license to convert opportunities to bots.

[Supported licenses for Discovery Bot](#) on page 956

1. Review the data in the Opportunities tab:

- a) From your local machine, log in to your Enterprise Control Room as Discovery Bot analyst.
- b) Go to Discovery Bot > Opportunities.

The Opportunities page displays all the opportunities you have created. You can configure the menu option to display as you want using the Customize columns icon. The table lists the following information:

Field	Description
ID	The system-generated ID associated with the opportunities created.
Opportunity Name	The name created for the opportunity.
Priority	The priority level assigned to the opportunity. The priority can be one of the following: • Low • Medium • High
Savings	The potential savings associated with the opportunity (this could have been specified as a yearly savings or savings per run).
Process	The name created for the process.
Owner	The name of the process owner.

Field	Description
PDD	Click Download PDD to export and download the opportunity data into a Process Definition Document (PDD) Word document. The Download PDD option is also available from the View opportunity page.

- c) Select the required opportunity by sorting, searching, or both from the table using the Search field.
 - d) Click an opportunity from the table.
The View opportunity page is displayed. The Dashboard and Aggregated views are available to review the opportunity details.
2. Optional. Create another opportunity from this opportunity, if required:
 - a) Click the Aggregated tab.
 - b) Select the check box to the left of the step to create a new opportunity.
 - c) Enter the fields in the Opportunity details tab.
 - d) Click Create opportunity to save the new opportunity.
 3. Convert to bot:
 - a) Click the Convert to bot option.
 - b) Enter a bot name.
 - c) Optional: Enter a description.
 - d) Click Browse and accept the default folder location `\Bots\`.
To change the location where your bot is stored, drill down to the folder in which you want to save the bot.
 - e) Click Confirm.
 - f) Click Convert.
A message window appears notifying you that the bot has started to convert. You will receive an email when the bot is converted successfully. Click the hyperlink in the email to take you to your folder in which the bot was generated.



Note: In the My bots tab, the converted bot displays an error, with 0 byte size while the bot creation is in process. Avoid opening the bot until the bot conversion is complete.

The Convert to bot option is only available if you have the Bot Creator license. To review the created bot you must have the AAE_Basic role assigned.

4. Click the Download PDD option to export the opportunity data into a Process Definition Document (PDD) Word document with the same name as the opportunity.

When an opportunity is created, the PDD begins processing in the background automatically. When the PDD is done generating, the field changes from generating PDD to Download PDD. You can now download the document. An email notification to the opportunity owner is also sent to the email address on file. You can also download the PDD for that opportunity from the Opportunities page. If you receive an error downloading the PDD, click Download PDD again to re-generate the PDD.



Note: The Download PDD option is disabled if you are not the owner of the opportunity. You must be the owner of the opportunity to be able to download the PDD.

The document is saved in the folder on your machine that is configured for downloads in your browser.

Using IQ Bot for intelligent document processing

IQ Bot is the only web-based, cloud-native intelligent document processing solution that business users can easily set up to automatically read and process a variety of complex documents quickly. This version has limited features and is offered to users as a free Community Edition version.

How to use Community Edition



Important: This new Community Edition includes a preview of IQ Bot with Auto-extraction.

Community Edition is a special version of our product in the Cloud, available for all users who want to try RPA, and IQ Bot at no cost. Users are not required to purchase a license, and there are no time limitations. However, there are some functionality constraints as follows:

- You can create up to a maximum of five learning instances per user.
- In the learning instance list, you can view and access learning instances and data created by you only.
- You can process up to a 100 pages per month for each user account.

To begin using the new Community Edition version:

1. Select the Community Edition URL you received in your email and click the Open IQ Bot option.
2. In the IQ Bot Learning Instances page, choose an option to create learning instances:

Options	Create learning instances	Type of learning instances
Option 1:	Click the Create Learning Instance option.	Create learning instances using IQ Bot with Auto-extraction Invoices. Create a learning instance in IQ Bot A2019 on page 986
Option 2:	Click the Train other documents option.	Create and train learning instances for other document types using IQ Bot. IQ Bot Community Edition quick start guide

[Automation Anywhere Community Edition](#) now offers a unified UI experience for IQ Bot. Users can perform the following tasks by navigating to Control Room > IQ Bot:

1. Create a learning instance.
2. Process documents to extract data for invoices, with predefined form and table fields.

3. Validate failed documents manually by using the Validator form.
4. View learning instance dashboard metrics that are integrated with Bot Insight.

Requirements for creating a learning instance in IQ Bot Community Edition

Before you begin using Community Edition, review the system requirements and settings.

System requirements

Ensure you have completed the following requirements:

- Users require a minimum hardware of 4 CPU cores and 8 GB RAM.



Note: This requirement is for the Bot Runner.

- Use the supported document formats:
 - Digital PDF
 - JPEG
 - JPG
 - PNG
- See Bot agent system requirements: [Bot agent compatibility](#) on page 403.

Prerequisites

Complete the following prerequisites to start using IQ Bot Community Edition:

- Install [Microsoft Visual C++ latest supported downloads](#) from Microsoft Visual Basic C++ Studio 2015, 2017, and 2019 section, on the Bot Runner.
- [Install Bot agent and register device](#) on page 400

Create a learning instance in IQ Bot A2019

Create a learning instance using IQ Bot Auto-extraction invoice (document type) to process and validate your documents. For this release, users can process invoices in English.

IQ Bot provides you with a predefined set of form and table fields as follows:

Form fields	Table fields (columns)
Invoice number	Unit price
Invoice date	Quantity
Purchase Order number	Description
Shipping address	Total price
Billing address	-

Form fields	Table fields (columns)
Total amount	-

1. Navigate to Control Room > IQ Bot > Learning Instances > Create Learning Instance.
2. Provide a name and an output folder path.
The system creates the Output folder on your machine when the document extraction bot is executed.
The learning instance appears on the IQ Bot > Learning Instances dashboard.
Users can create up to five learning instances. After that, the system displays a message stating the limitation.
3. To delete a learning instance, click the ellipsis next to the learning instance and select the delete action.
4. Navigate to Control Room > IQ Bot > Learning Instances > Train other documents to view the legacy version of IQ Bot Community Edition.

Create a bot to process your documents.

Extracting information from documents

After you complete creating a learning instance, create a bot to extract fields from the documents using the learning instance you created.

Create a learning instance before you create a bot.

Create a bot, and then use the IQ Bot (Preview) > Document Extraction action to process your documents and extract data. Users can upload multi-page PDF documents for data extraction.



Note: IQ Bot uses the ABBYY FineReader Engine for OCR.

1. Go to Bots > My bots and click Create a bot.
2. In the Create Task Bot window, enter a name and click Create & edit.
3. The bot designer window appears.
4. In the Edit Task Bot > Actions column, search for IQ Bot to display the available actions.
5. Drag the IQ Bot (Preview) > Document Extraction action into your workflow.
6. In the Input File Path field, use Browse to navigate to the file you want to process.
7. From the Learning Instance that will process the document drop-down list, select your learning instance.
8. Optional: In the Save response code to variable (optional) field, select prompt-assignment – String from the drop-down list.
The action response code is saved in the provided variable.
9. Optional: Drag the Message box action to display results in the message box. Define the message you want to see displayed in the message box.
 - a) Click the Insert a value (F2) icon in the Enter the message to display field.
 - b) In the Insert a value dialog box, select prompt-assignment – String from the drop-down list and click Yes, insert.
10. Click Save and then click Run to run the bot.

If all the fields are extracted and the value has a high confidence, the system sends the data to the `Success` folder. The status of the data extraction is updated in Bot Insight and is reflected in the Learning Instance page.

After document processing is complete, IQ Bot sends successfully extracted data to the output folder, specified during learning instance creation, and the `Success` subfolder for successfully processed documents; while failed documents are sent to a different folder for validation.



Note: The outputs are in the JSON format.

The extracted files are sent to the output folder you previously configured as a prerequisite step:

- Go to the `Output\Success` folder on your machine to view the successfully extracted data.
- Go to the `Output\Data` folder and the `Output\Meta` folder on your machine to view information about the failed documents requiring validation.
- Go to the `Output\Unprocessed` folder on your machine to view the documents not extracted by the Document Extraction action.

Based on the extraction results the IQ Bot > Learning Instance dashboard displays the updated STP (straight-through processing), total number of uploaded documents, and the number of documents pending review.

Validate documents

This is the final phase of the process where you manually validate error value fields in each document in the validation queue.

1. To validate the failed documents, navigate to IQ Bot > Learning Instances and click the Review documents option next to the learning instance.
The Validator form appears with the first failed document in queue.
2. Update the error fields manually.
3. During table validation, add or delete rows if required.
 - a) Click the ellipsis next to a row to see the allowed actions.
 - b) Add any number of rows, and enter the values in the cells.
You will not be able to add new rows after you delete all the rows from a table. Remember to create a new row first before deleting all unwanted rows.
4. After you complete the corrections, select Submit to complete validating the current document.
After validation, the updated value results are sent to the `Success` folder.
The Validator shows the next document in queue. When all documents are corrected, the system displays a message stating that there are no more documents available for validation.

Build advanced bots and packages

Learn how to build action packages and advanced bots that include custom features such as scripting, and API calls. Find recommendations on bot and action package design and reusability.

More resources

On the [Developer portal](#), find additional how-to tutorials on building advanced bots and packages.

Package Software Development Kit (SDK)

Review the requirements and process for creating and uploading an action package to your Enterprise Control Room.

Packages are Java Archive (JAR) files containing the executable third-party applications used to create bots. Actions are available in the Enterprise Control Room under the Action Panel.

The Automation Anywhere Package Development Kit provides detailed instructions for users to independently develop custom actions and upload and manage packages in their Enterprise Control Room.

The SDK includes sample code and supporting files for Java developers to create and validate custom actions.

February 2021, Release (A2019.19)	A2019-package-sdk-2.0.8.zip
January 2021, Release (A2019.18)	A2019-package-sdk-2.0.7.zip
November 2020, Release (A2019.17)	A2019-package-sdk-2.0.6.zip
September 2020, Release (A2019.16)	A2019-package-sdk-2.0.5.zip
August 2020, Release (A2019.15)	A2019-package-sdk-2.0.4.zip
July 2020, Release (A2019.14)	A2019-package-sdk-2.0.3.zip
May 2020, Release (A2019.13)	A2019-package-sdk-2.0.2.zip
April 2020, Release (2019.12.1)	A2019-package-sdk-2.0.1.zip
April 2020, Release (2019.12)	A2019-package-sdk-2.0.0.zip
March 2020, Release (2019.11)	A2019-package-sdk-1.0.11.zip



Note: All the components for this update to the Package SDK are included in this single zip file.

February 2020, Release (A2019.10)	A2019.10-package-sdk-1.0.0.zip



Note: All the components for the Package SDK are included in a single zip file starting with the A2019.10 release.

January 2020, Release (A2019.09)	• SDK Demo Package: A2019.09-packageSDK-1.0.0.zip • Documentation: A2019.09-package-annotations-javadoc.zip
November 2019 Release (A2019.08)	• SDK Demo Package: A2019.08-packageSDK-1.0.0.zip • Documentation: A2019.08-package-annotqations-javadoc.zip
October 2019 Release (A2019.07)	• SDK Demo Package: A2019.07-Package-Sdk-1.0.0.zip

August 2019 Release (A2019.06)

- Documentation: [A2019.07-package-annotations-javadoc.zip](#)
- SDK Demo Package: [A2019DemoPackage.zip](#)
- Documentation: [A2019-package-annotations-javadoc.zip](#)

For detailed release notes for the SDK Packages, see [Enterprise A2019 Package Development Kit Release Notes](#) on page 1031.

Click a title to read details about each task in the process.

[Setting up the Java project](#) on page 990

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

[Standard coding practices and guidelines for developing packages](#) on page 993

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

[Develop a sample package](#) on page 995

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

[Build and test a custom package](#) on page 1026

Use IntelliJ to build a custom package and use Enterprise A2019 actions to test the package.

Related reference

[Enterprise A2019 Package Development Kit Release Notes](#) on page 1031

These release notes describe new, changed, fixed, deprecated features, and security fixes, as well as known issues and limitations for the Enterprise A2019 Package Development Kit.

Setting up the Java project

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

A working knowledge of Java and Gradle is required in order to successfully build an action package. You require the following software and file:

- Java Developer Kit (JDK) 11
- Java IDE

- Eclipse
- Community edition of IntelliJ
- Gradle plug-in v.5.*.* in the IDE
- Automation Anywhere Bot agent installed and connected to a valid Enterprise Control Room account
- Download and extract the zip archive files for the release you need:

February 2021, Release (A2019.19)	A2019-package-sdk-2.0.8.zip
January 2021, Release (A2019.18)	A2019-package-sdk-2.0.7.zip
November 2020, Release (A2019.17)	A2019-package-sdk-2.0.6.zip
September 2020, Release (A2019.16)	A2019-package-sdk-2.0.5.zip
August 2020, Release (A2019.15)	A2019-package-sdk-2.0.4.zip
July 2020, Release (A2019.14)	A2019-package-sdk-2.0.3.zip
May 2020, Release (A2019.13)	A2019-package-sdk-2.0.2.zip
April 2020, Release (2019.12.1)	A2019-package-sdk-2.0.1.zip
April 2020, Release (2019.12)	A2019-package-sdk-2.0.0.zip
March 2020, Release (2019.11)	A2019-package-sdk-1.0.11.zip



Note: All the components for this update to the Package SDK are included in this single zip file.

February 2020, Release (A2019.10)	A2019.10-package-sdk-1.0.0.zip



Note: All the components for the Package SDK are included in a single zip file starting with the A2019.10 release.

January 2020, Release (A2019.09)	• SDK Demo Package: A2019.09-packageSDK-1.0.0.zip • Documentation: A2019.09-package-annotations-javadoc.zip

November 2019 Release (A2019.08)	• SDK Demo Package: A2019.08-packageSDK-1.0.0.zip • Documentation: A2019.08-package-annotqations-javadoc.zip

October 2019 Release (A2019.07)	• SDK Demo Package: A2019.07-Package-Sdk-1.0.0.zip • Documentation: A2019.07-package-annotations-javadoc.zip

August 2019 Release (A2019.06)	• SDK Demo Package: A2019DemoPackage.zip

- Documentation: [A2019-package-annotations-javadoc.zip](#)

Initial setup of your IDE is important so that you have the correct environment for creating Automation Anywhere action packages.



Important: The listed prerequisites are recommendations for use with all the sample code and instructions included in this package development kit.

1. Extract the content of the associated sample zip files to a folder you can access from your IDE.
2. Import the content in any java IDE of your choice as a Gradle project.
3. Edit the settings.gradle and change the root project name to something meaningful to you.



Tip: The settings.gradle file is included in the A2019DemoPackage.zip file.

4. Go to src > main > resources > package.template and change the package name and related information to something meaningful.

Original package.template	Updated package.template
<pre>{ "name": "A2019DemoPackage", "label": "A2019DemoPackage", "description": "Provides actions for A2019DemoPackage operations.", "group": "", "artifactName": "", "packageVersion": "", "codeVersion": "", "commands": [] }</pre>	<pre>{ "name": "YourPackageName", "label": "Appropriate label", "description": "Meaningful description for the actions contained in the package.", "group": "", "artifactName": "", "packageVersion": "", "codeVersion": "", "commands": [] }</pre>



Tip: The package template file controls the following names and labels of your package.

- "name" is the JAR file name
Package file naming conventions:
 - No spaces
 - No special characters
- "label" is what appears in the Action panel of your Enterprise Control Room

Related concepts

[Standard coding practices and guidelines for developing packages](#) on page 993

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Related tasks

[Develop a sample package](#) on page 995

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

Standard coding practices and guidelines for developing packages

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

Testing

Ensure high quality code. Write sufficient unit tests and integration tests for your package.

Icons

Set proper icon for your package.

Setting the version manually

The SDK package build version gets updated automatically every time a build happens. However, you can set it manually in the command project of a common build.gradle file.

- Update the build.gradle file before a build.
- Enter up to four digits numbers, separated by a period, as shown below:

```
...
ext {
    version '2.1.0'
}
dependencies {...}
```

Dependencies

Embed all the dependencies in your package JAR. Load the dependencies at run time by extracting them to a temporary location. Be sure to clean the temporary location after the dependencies are loaded.

Dependent JAR files

Add dependent JAR files under dependencies in the build.gradle file as implementation so that the dependant JAR files are packaged.

```
...
dependencies {
    compileOnly name: 'command-
    annotations'
    compileOnly name: 'bot-runtime'
    compileOnly name: 'bot-api'
    implementation name: 'i18n-api'
    implementation
    name: 'mydependentjavafile.jar'
    apt name: 'command-processor'
```

```

compileOnly
group: 'org.apache.logging.log4j',
name: 'log4j-core',
version: "$loggerVersion"

testImplementation "org.testng:testng:
$testNgVersion"
testImplementation name: 'bot-
runtime'
testImplementation name: 'bot-api'
}
. . .

```

Add new actions to the existing package

When adding new actions to an existing package, make sure to do clean before packaging. It is always a good practice to do clean build - gradlew.bat clean build shadowJar.

Error messages

Provide meaningful error messages.

- Do throw meaningful error messages. For example, in local language using i18n APIs with BotCommandException, throw a new exception
`BotCommandException(MESSAGES.getString("Run.E`
- Do not throw generic error messages, such as `ex.message`.

Basic validation

Use the validation annotation rules, such as `@NotEmpty` included with this development kit. Do not add basic validations for your code. See [Validation annotations](#) on page 1019.

Loops

Avoid long running loops in your code. Long running loops can cause high CPU usage, leading to errors such as, "Bot is unresponsive."

Add logging

Use the default log4J logger provided in the bot run time framework. Do not add your own logger. See the sample code for details.

Logging levels

- ERROR/FATAL: Severe error event that the user is affected and there is no workaround.
- WARN : Unexpected error occurred but the system has recovered from it.
- INFO: Informational messages about state change, for example, an accepted request.
- DEBUG: Detailed diagnostic information that will be required to debug when something goes wrong.
- TRACE: All information is captured about an application behavior.

If you are not sure of the log level, set it to TRACE.

Loading resources

All resources should be loaded using current thread context class loader, as shown in the following example:

```
Thread.currentThread().getContextClassLoader().getResources("resources").toList()
```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

Related tasks

[Setting up the Java project](#) on page 990

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

[Develop a sample package](#) on page 995

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

Develop a sample package

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

Download and extract the contents from [A2019.10-package-sdk-1.0.0.zip](#). This package contains the necessary source code for the sample package.

You need to have a project created in a Java IDE. For details about setting up a project, read [Setting up the Java project](#) on page 990.

The following high-level tasks provide the basic workflow for creating a package.

1. Create a java class.

This class is the action you plan to publish in your package.



Important: It is required that the class supports the default constructor.

2. Add required business logic to the class.

The following are the supported return types:

- Void: Use this return type if your action does not return any value.
- Value: Use this return type if your action returns any type of value.

3. Annotate the class with **BotCommand** and **CommandPkg** Annotations to make the class eligible to be converted to an action.
4. Annotate the variable that accept values with **Idx** and **Pkg**.
5. Annotate the entry method with the **Execute** annotation.
6. From the action prompt, run `gradlew.bat clean build shadowJar`.
The JAR file created from the build is located in **build/lib**.
7. From the Enterprise Control Room on the Bots > Package, click the Add package icon to upload JAR file.

From the Enterprise Control Room on the Bots > Package page, click the Add package icon to upload the JAR file.



Tip: To upload a package to a Enterprise Control Room, you need Upload package permission. Read details about how to add a package to an Enterprise Control Room: [Add packages to the Enterprise Control Room](#) on page 1098.

Related concepts

[Standard coding practices and guidelines for developing packages](#) on page 993

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

[Annotations](#) on page 1015

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Related tasks

[Setting up the Java project](#) on page 990

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

How to examples

This section contains code examples and explanations about how to code some basic bot capabilities.

[Return a value from an action](#) on page 997

Set the following properties on **CommandPkg** to store the action output in a variable.

[Expose an action as a property](#) on page 998

An action can be exposed as property if it does not accept any parameter. This can be done by setting the following properties on **CommandPkg**.

[Create custom variables using Package SDK](#) on page 999

When using Enterprise A2019, you can create custom variables using the SDK package.

[Create a condition using Package SDK](#) on page 1000

When using Enterprise A2019, you can create a condition with the SDK package.

[Add a condition in a custom package for If condition](#) on page 1002

Add conditions in a custom package.

[Create an iterator using Package SDK](#) on page 1002

In Enterprise A2019, you can create an iterator with the SDK package. An iterator is used to loop through multiple objects of similar type and is used with the Loop package. It consists of two methods, **next** and **hasNext**, which return the actual object and a Boolean value.

[Create a trigger using Package SDK](#) on page 1005

When using Enterprise A2019, you can create a trigger using the SDK package.

[Trigger examples of pull and push mechanism](#) on page 1008

The examples provided in this topic demonstrate the trigger pull (**link TriggerDemo**) and push (**SimpleMessageListenerContainer**) mechanisms using the SDK package.

[Add an iterator in a custom package for Loop action](#) on page 1012

Add an iterator in your package for **Loop** action.

[Add debug logs of custom packages to bot_launcher.log file](#) on page 1013

You can add logs using `log4j`. The dependency is already added in the sample `build.gradle` file.

[Handle sessions in a custom package](#) on page 1014

You can extract a session using a session name from the `SessionsMap`.

There are three types of actions:

- `Command\Action` (default choice)
- `Iterator`
- `Condition`

Any action class supports only one method as an entry point. Annotate all parameters of the entry point method with `Idx`.



CAUTION: If you do not provide a public setter to member variables with `Inject`, compilation errors occur.

Related concepts

[Standard coding practices and guidelines for developing packages](#) on page 993

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

Related tasks

[Setting up the Java project](#) on page 990

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

[Develop a sample package](#) on page 995

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

Return a value from an action

Set the following properties on `CommandPkg` to store the action output in a variable.

Action return values

`return_type`

Defines the return type of the action. It usually matches the entry method return type.

`return_required`

When is set to `true` the return value is required.

`return_label`

The UI label when asking for the variable to store the value.

```
@BotCommand
@CommandPkg(label = "Uppercase", name = "uppercase", description="Converts
the source string to upper case.",
icon = "uppercase.svg", node_label="Convert {{sourceString}} to upper case|
and assign the result to {{returnTo}}|",
```

```

return_type=DataType.STRING, return_required = true, return_label="Assign
the output to variable",
property_name="uppercase", property_description="Converts the string to
upper case", property_type=DataType.STRING,
property_return_type=DataType.STRING) public class UpperCase {

    @Execute
    public Value<String> convert(
        @Idx(index = "1", type=TEXT)
        @Pkg(label="Source string")
        @NotEmpty
        String sourceString){
        return new StringValue(sourceString.toUpperCase());
    }
}

```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Expose an action as a property

An action can be exposed as property if it does not accept any parameter. This can be done by setting the following properties on **CommandPkg**.

Action property values

property_name	The name of the property, unique at action level, in auto-complete box this name would appear.
property_description	A description of the property.
property_type	The data type on which property operates, only if the type matches, the property will be appear in the auto-complete box.
property_return_type	The data type for what property returns. If this type does not match with the field type where it is used, there will be validation error.

```

@BotCommand
@CommandPkg(label = "Uppercase", name = "uppercase", description="Converts
the source string to upper case.",
icon = "uppercase.svg", node_label="Convert {{sourceString}} to upper case|
and assign the result to {{returnTo}}|",
return_type=DataType.STRING, return_required = true, return_label="Assign
the output to variable",
property_name="uppercase", property_description="Converts the string to
upper case", property_type=DataType.STRING,
property_return_type=DataType.STRING) public class UpperCase {

    @Execute
    public Value<String> convert(
        @Idx(index = "1", type=TEXT)
        @Pkg(label="Source string")
        @NotEmpty
        String sourceString){
        return new StringValue(sourceString.toUpperCase());
    }
}

```

```
}
```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Create custom variables using Package SDK

When using Enterprise A2019, you can create custom variables using the SDK package.

Using custom variables

Use Enterprise A2019 to create a custom variable. This is a system variable and is used as other bot variables, except it is read-only and the value is calculated instead of being assigned.

Required annotations

For creating a variable, the following annotations are required:

Annotation	Usage
<code>BotCommand</code>	Use the <code>BotCommand</code> annotation with the <code>variable</code> as <code>commandType</code> . This ensures that the plain old Java object (POJO) is suitable for creating an Enterprise A2019 variable.
<code>CommandPkg</code>	These values are used when creating a package. Provide a name, label, and description to the annotation.
<code>Idx</code>	Annotate all the parameters and member variables that are required and help with the validation check. Alternatively they might be displayed in the interface for the input. Provide the index (<code>Idx</code>) and the type.
<code>Pkg</code>	Annotate all the parameters and member variables that will be shown in the interface. This annotation will be ignored if it is not accompanied by the <code>Idx</code> .
<code>VariableExecute</code>	The method that has to be called for returning the variable value. This method does not accept any input parameters. <code>Sessions</code> and <code>GlobalSessionContext</code> are available through setter injection.

Use case example

The following use case shows how to return the current time for the system default zone.

1. Create the POJO class with the business logic:

```
public class Now {

    public DateTimeValue now() {
        Instant instant = Instant.now();
```

```

        ZonedDateTime now = instant.atZone(ZoneId.systemDefault());
        return new DateTimeValue(now);
    }
}

```

2. Annotate the POJO class to enable it for the Enterprise A2019 variable and to create the package:

```

@BotCommand(commandType = BotCommand.CommandType.Variable)
@CommandPkg(description = "The current datetime at system default zone.",
    name = "Now", label = "", variable_return_type = DataType.DATETIME)
public class Now {

    public DateTimeValue now() {
        Instant instant = Instant.now();
        ZonedDateTime now = instant.atZone(ZoneId.systemDefault());
        return new DateTimeValue(now);
    }

}

```

3. Annotate the now method to denote it to be the execute method.

```

@VariableExecute
public DateTimeValue now() {
    Instant instant = Instant.now();
    ZonedDateTime now = instant.atZone(ZoneId.systemDefault());
    return new DateTimeValue(now);
}

```

Every variable must have one test `VariableExecute` method.

Create a condition using Package SDK

When using Enterprise A2019, you can create a condition with the SDK package.

Using a condition

If and Loop are branching constructs in Enterprise A2019. They are used to run a sequence of actions when a condition is set to `true`. A condition is used along with the If and Loop packages. A condition takes a set of inputs and returns a Boolean value.

Required annotations

For creating a condition, the following annotations are required:

Annotation	Usage
<code>BotCommand</code>	Use the <code>BotCommand</code> annotation with the condition as <code>commandType</code> . This ensures that the plain old Java object (POJO) is suitable for the creation of an Enterprise A2019 condition.
<code>CommandPkg</code>	These values are used when creating a package. Provide a name, label, and description to the annotation.

Annotation	Usage
Idx	Annotate all the parameters and member variables that are required and help with the validation check, or they might be displayed in the interface for the input. Provide the index (Idx) and the type.
Pkg	Annotate all the parameters and member variables that will be shown in the interface. This annotation will be ignored if it is not accompanied by the Idx.
ConditionTest	The method that has to be called for testing the condition. It must return a Boolean value. If the method accepts parameters, then annotate them with Idx.

Use case example

The following use case verifies whether the given number is greater than the other number.

1. Create the POJO class with the business logic:

```
public class IsGreater {

    public Boolean checkGreater(Double first, Double checkAgainst) {
        return first > checkAgainst;
    }

}
```

2. Annotate the POJO class to enable it for the Enterprise A2019 condition and to create the package:

```
@BotCommand(commandType = Condition)
@CommandPkg(label = "Is greater condition", name = "IsGreater",
    description = "Checks if the given number is greater than the other.",
    node_label = "{{first}} > {{checkAgainst}} ")
public class IsGreater {
    public Boolean checkGreater(Double first, Double checkAgainst) {
        return first > checkAgainst;
    }
}
```

3. Annotate the checkGreater method to indicate that this method should be used as a comparison method.

```
@ConditionTest
public Boolean checkGreater(Double first, Double checkAgainst) {
    return first > checkAgainst;
}
```

Every condition must have exactly one test condition method.

4. Annotate the parameters of the checkGreater method with Idx and Pkg.

Add @NotEmpty to ensure the value is not null.

```
@ConditionTest
public Boolean checkGreater(
    @Idx(index = "1", type = AttributeType.NUMBER) @Pkg(label = "Number to
    check") @NotEmpty Double first,
```

```
@Idx(index = "2", type = AttributeType.NUMBER) @Pkg(label = "Number to
compare against") @NotEmpty Double checkAgainst) {

    return first > checkAgainst;
}
```

The attribute type number returns a Double.

Add a condition in a custom package for `if` condition

Add conditions in a custom package.

Create condition values in an Action

- To create a condition, set `commandType` property of `BotCommand` annotation with value as `Condition`.
- To define the entry method of the condition, use the annotation `ConditionTest`.

```
@BotCommand(commandType = Condition)
@CommandPkg(label = "File exists", name = "fileExists",
    description = "Checks the file exists condition.",
    node_label = "file exists at {{sourceFilePath}}", icon = "")
public class Exist extends AbstractCondition {
    @ConditionTest
    public boolean test(@Idx(index = "1", type = FILE) @LocalFile @Pkg(label
= "File path") @NotEmpty String sourceFilePath,
        @Idx(index = "2", type = NUMBER) @Pkg(label = "How
long you would like to wait for this condition
to be true?(Seconds)",
            default_value = "0", default_value_type =
DataType.NUMBER)

        @GreaterThanEqualTo("0") @LessThanEqualTo("99999") @NotEmpty @NumberInteger
        Double waitTimeout) {

        // Logic to check for the condition goes here

    }
}
```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Create an iterator using Package SDK

In Enterprise A2019, you can create an iterator with the SDK package. An iterator is used to loop through multiple objects of similar type and is used with the Loop package. It consists of two methods, `next` and `hasNext`, which return the actual object and a Boolean value.

Required annotations

When iterator is used, the `next` method returns the next available value. If no more values are available, an exception is shown. The `hasNext` method checks for other values and returns `false` if no more

values are available. In Enterprise A2019, when the loop is executed, `hasNext ()` is called first, and `next ()` is called only if `hasNext ()` returned a `true` value.

For creating an iterator, the following annotations are required.

Annotation	Usage
<code>BotCommand</code>	Use the <code>BotCommand</code> annotation with an iterator as the <code>commandType</code> . This ensures that the plain old Java object (POJO) is eligible for creating an Enterprise A2019 iterator.
<code>CommandPkg</code>	When creating a package, provide a name, label, and description to the annotation.
<code>Idx</code>	Annotate all parameters and member variables that are required and help with the validation check, or they can be displayed in the interface for the input. Provide the <code>Idx</code> and the type.
<code>Pkg</code>	Annotate all parameters and member variables that will be displayed in the interface. This annotation will be ignored if it is not accompanied by the <code>Idx</code> .
<code>HasNext</code>	The method that has to be called for testing if the iteration has more elements (returns <code>true</code> if <code>next ()</code> returns an element rather than throwing an exception). It must return a Boolean value. If the method accepts parameters, then they must be annotated with the <code>Idx</code> . The <code>hasNext</code> method verifies it and returns <code>false</code> if no more values are available. In Enterprise A2019, when Loop is executed, <code>hasNext ()</code> is called first. <code>next ()</code> is called only if <code>hasNext ()</code> returns a <code>true</code> value.
<code>Next</code>	The method returns the next available value in the iteration. The return type is a value. If no more value is available, an exception is shown.

Use case example

The example use case loops through number of times, for example, `for (int i=0; I<n; i++)` Java construct. It accepts the value of `n` from the Bot Creator when the bot is created.

1. Create the POJO class with the business logic.

Ensure that the POJO has a method and returns a Boolean value. This will act as the comparison method.

```
public class IteratorTypeDemo {
    private Double times = 10 d;
    private Double counter = 0 d;

    public boolean hasNext() {
        return counter < times;
    }

    public Value < Double > next() throws Exception {
        if (counter >= times)

```



```

        throw new Exception("Counter '" + counter + "' is exceed the times
limit '" + times + "'");

        counter++;
        NumberValue result = new NumberValue();
        result.set(counter);
        return result;
    }

    public void setTimes(Double times) {
        this.times = times;
    }
}

```

2. Annotate the POJO class to enable it for the Enterprise A2019 iterator and to create a package.

```

@BotCommand(commandType = CommandType.Iterator)
@CommandPkg(return_label = "Return the value in variable", node_label =
": {{times}} times",
label = "Iterator demo", description = "Iterate number of times", name =
"iteratorTypeDemo", return_type = DataType.NUMBER)
public class IteratorTypeDemo {

    private Double times = 10 d;
    private Double counter = 0 d;

    public boolean hasNext() {
        return counter < times;
    }
}

```

3. Annotate the hasNext () and next () method appropriately.

```

@HasNext
public boolean hasNext() {
    return counter < times;
}

@Next
public Value < Double > next() throws Exception {
    if (counter >= times)
        throw new Exception("Counter '" + counter + "' is exceed the times
limit '" + times + "'");

    counter++;
    NumberValue result = new NumberValue();
    result.set(counter);
    return result;
}

```

The methods are named in easy-to-use way and are in parallel with the Java iterator interface. There is no restriction from the SDK side when naming methods.

In an iterator, do not use parameter methods, but use `setter injection`.

4. Annotate the variables with Idx and Pkg.

Add `@NotEmpty` to ensure the value is not null, and add `@GreaterThanEqualTo` to ensure the value is always greater than 0.

```

@Idx(index = "1", type = AttributeType.NUMBER)
@Pkg(label = "times", default_value = "10", default_value_type =
DataType.NUMBER)

```

```
@GreaterThanEqualTo("0")
@NotEmpty
@Inject
private Double times = 10 d;
```

The attribute type number returns a Double.

Create a trigger using Package SDK

When using Enterprise A2019, you can create a trigger using the SDK package.

Using a trigger

Use Enterprise A2019 to create a trigger. A trigger launches a bot when certain conditions are met and waits until conditions have changed or stopped. When the conditions of the trigger are matched, the run method is called to signal the trigger.

Required annotations

For creating a trigger, the following annotations are required:

Annotation	Usage
BotCommand	Use the BotCommand annotation with the trigger as commandType. This ensures that the plain old Java object (POJO) is suitable for creating the trigger with Enterprise A2019.
CommandPkg	These values are used when creating a package. Provide a name, label, and description to the annotation.
Idx	Annotate all the parameters and member variables that are required and help with the validation check. Alternatively, they might be displayed in the interface for the input. Provide the index (Idx) and the type.
Pkg	Annotate all the parameters and member variables that will be shown in the interface. This annotation will be ignored if it is not accompanied by the Idx.
StartListen	Starts the trigger listener.
TriggerId	A trigger ID, which is required for stopping the trigger.
TriggerRunnable	Provides the runnable. Calling the runnable sends a signal that launches a bot associated with a trigger.

Use case example

The following use case shows how to create a timer trigger that triggers a bot at a regular interval.

1. Create the POJO class with the business logic:

```
public class TriggerDemo {

    private static final Timer TIMER = new Timer(true);

    public void startTrigger(Double interval) {
        TimerTask timerTask = new TimerTask() {

            @Override
            public void run() {
                // Do nothing
            }
        };

        TIMER.schedule(timerTask, interval.longValue());
    }
}
```

Multiple triggers of the same type can exist in a bot. All triggers are identified by a `triggerId`.

2. Add a `triggerId` to the class:

```
@TriggerId
private String triggerUid;

public String getTriggerUid() {
    return triggerUid;
}

public void setTriggerUid(String triggerUid) {
    this.triggerUid = triggerUid;
}
```

3. Store the `TimerTask` separately so that when you want to stop a specific trigger, use the `triggerId`.

```
private static final Map<String, TimerTask> taskMap = new
    ConcurrentHashMap<>();

public void startTrigger(Double interval) {
    TimerTask timerTask = new TimerTask() {

        @Override
        public void run() {
            // Do nothing
        }
    };

    taskMap.put(this.triggerUid, timerTask);
    TIMER.schedule(timerTask, interval.longValue());
}
```

4. Start a trigger when conditions are met. Accept a runnable and call it appropriately.

```
@TriggerRunnable
private Runnable runnable;

public Runnable getRunnable() {
    return runnable;
}

public void setRunnable(Runnable runnable) {
    this.runnable = runnable;
}

public void startTrigger(Double interval) {
    TimerTask timerTask = new TimerTask() {

        @Override
        public void run() {
            runnable.run();
        }
    };

    taskMap.put(this.triggerUid, timerTask);
    TIMER.schedule(timerTask, interval.longValue());
}
```

5. Stop the trigger, either individually (use a triggerId), or stop all triggers at the same time (StopAllTriggers).

```
/*
 * Cancel all the task and clear the map.
 */
@stopAllTriggers
public void stopAllTriggers() {
    taskMap.forEach((k, v) -> {
        if (v.cancel()) {
            taskMap.remove(k);
        }
    });
}

/*
 * Cancel the task and remove from map
 *
 * @param triggerUid
 */
@stopListen
public void stopListen(String triggerUid) {
    if (taskMap.get(triggerUid).cancel()) {
        taskMap.remove(triggerUid);
    }
}
```

6. Add the remaining annotations.

```
@BotCommand(commandType = BotCommand.CommandType.Trigger)
@CommandPkg(label = "Demo Trigger", description = "Demo Trigger", icon =
    "email.svg", name = "demoTrigger")
public class TriggerDemo {
    //Other code

    @StartListen
```

```

public void startTrigger(@Idx(index = "1", type = AttributeType.NUMBER)
@Pkg(label = "Please provide the interval to trigger in seconds",
default_value = "120", default_value_type = DataType.NUMBER)
@GreaterThan("0")
@NumberInteger
@NotEmpty
Double interval) {
    //Other code
}

}

```

Trigger examples of pull and push mechanism

The examples provided in this topic demonstrate the trigger pull (link [TriggerDemo](#)) and push ([SimpleMessageListenerContainer](#)) mechanisms using the SDK package.

Pull mechanism example

This example is an extension of the timer-based trigger ([TriggerDemo](#)) and demonstrates the trigger pull mechanism.

- A trigger checks the database (DB) at regular intervals and if the SQL (DB) value that a user provides is more than 0, then the timer-based trigger is triggered.
- Add the valid DB driver in the build gradle to run this example.



Note: This class is intended as an illustrative example and must not be used in the production environment.

```

@BotCommand(commandType = BotCommand.CommandType.Trigger)
@CommandPkg(label = "JDBC Query Trigger", description = "JDBC Query
Trigger", icon = "jdbc.svg", name = "jdbcQueryTrigger")
public class DBStatus {
    private static Logger logger = LogManager.getLogger(DBStatus.class);
    // Map storing multiple tasks
    private static final Map<String, TimerTask> taskMap = new
    ConcurrentHashMap<>();
    private static final Timer TIMER = new Timer(true);

    @TriggerId
    private String triggerUid;
    @TriggerRunnable
    private Runnable runnable;

    /*
     * Starts the trigger.
     */
    @StartListen
    public void startTrigger(
        @Idx(index="1", type = AttributeType.TEXT)
        @Pkg(label = "Provide the database driver class")
        @NotEmpty
        String driverClassName,

        @Idx(index="2", type = AttributeType.TEXT)
        @Pkg(label = "Provide the Jdbc connection string")
        @NotEmpty
        String jdbcUrl,

```

```

@Idx(index="3", type = AttributeType.TEXT)
@Pkg(label = "Provide the user Name")
@NotEmpty
String userName,

@Idx(index="4", type = AttributeType.CREDENTIAL)
@Pkg(label = "Provide the password")
@NotEmpty
SecureString password,

@Idx(index="5", type = AttributeType.TEXT)
@Pkg(label = "Provide the SQL statement to check the records")
@NotEmpty
String sqlQuery,

@Idx(index = "6", type = AttributeType.NUMBER)
@Pkg(label = "Provide the interval to query in seconds", default_value =
"300", default_value_type = DataType.NUMBER)
@GreaterThan("0")
@NumberInteger
@NotEmpty
Double interval) {

DataSource dataSource = getDataSource(driverClassName, jdbcUrl, userName,
password);

TimerTask timerTask = new TimerTask() {

@Override
public void run() {
    logger.debug("checking DB");
    try {
        if(checkRecordsExist(dataSource.getConnection(), sqlQuery)){
            runnable.run();
            return;
        }
    } catch (SQLException e) {
        logger.warn(e.getMessage(),e);
        logger.warn("Trigger is still running.");
    }
    logger.debug("no recorrd found");
}

};

taskMap.put(this.triggerUid, timerTask);
TIMER.schedule(timerTask, interval.longValue(), interval.longValue());
}

/*
 * Cancel all the tasks and clear the map.
 */
@stopAllTriggers
public void stopAllTriggers() {
    taskMap.forEach((k, v) -> {
        if (v.cancel()) {
            taskMap.remove(k);
        }
    });
}

}

/*

```

```

    * Cancel the task and remove from the map
    *
    * @param triggerUid
    */
    @StopListen
    public void stopListen(String triggerUid) {
        if (taskMap.get(triggerUid).cancel()) {
            taskMap.remove(triggerUid);
        }
    }

    public static DataSource getDataSource(String driverClassName, String
url, String userName, SecureString password) {
        BasicDataSource ds = new BasicDataSource();
        ds.setDriverClassName(driverClassName);
        ds.setUrl(url);
        ds.setUsername(userName);
        ds.setPassword(password.getInsecureString());
        return ds;
    }

    public static boolean checkRecordsExist(Connection con, String query)
        throws SQLException {

        Statement stmt = null;
        try {
            stmt = con.createStatement();
            ResultSet rs = stmt.executeQuery(query);
            rs.last();
            if (rs.getRow() > 0)
                return true;
        } catch (SQLException e) {
            throw new BotCommandException("Problem running statemnt", e);
        } finally {
            if (stmt != null) { stmt.close(); }
        }

        return false;
    }

    public String getTriggerUid() {
        return triggerUid;
    }

    public void setTriggerUid(String triggerUid) {
        this.triggerUid = triggerUid;
    }

    public Runnable getRunnable() {
        return runnable;
    }

    public void setRunnable(Runnable runnable) {
        this.runnable = runnable;
    }
}

```

Push mechanism example

The following example shows how to create a simple ActiveMQ message listener (SimpleMessageListenerContainer) to demonstrate the trigger push mechanism.

```
@BotCommand(commandType = BotCommand.CommandType.Trigger)
@CommandPkg(label = "JMS Trigger", description = "JMS Trigger", icon =
    "jms.svg", name = "jmsTrigger")
public class JMSQueue implements SessionAwareMessageListener {

    // Map storing multiple MessageListenerContainer
    private static final Map<String, MessageListenerContainer> taskMap = new
    ConcurrentHashMap<>();

    @TriggerId
    private String triggerUid;
    @TriggerRunnable
    private Runnable runnable;

    //This method is called by MessageListenerContainer when a message arrives.
    // Enable the trigger at this point
    @Override
    public void onMessage(javax.jms.Message message, Session session) throws
    JMSEException {
        runnable.run();
    }

    /*
     * Starts the trigger.
     *
     * This method is used to setup the trigger, that is setup the
     * MessageListenerContainer and start it.
     */
    @StartListen
    public void startTrigger(@Idx(index = "1", type = AttributeType.TEXT)
    @Pkg(label = "Provide the broker URL")
    @NotEmpty
    String brokerURL, @Idx(index = "2", type = AttributeType.TEXT)
    @Pkg(label = "Provide the queue name")
    @NotEmpty
    String queueName) {

        if (taskMap.get(triggerUid) == null) {
            synchronized (this) {
                if (taskMap.get(triggerUid) == null) {
                    SimpleMessageListenerContainer messageListenerContainer = new
                    SimpleMessageListenerContainer();
                    messageListenerContainer.setConnectionFactory(new
                    PooledConnectionFactory(brokerURL));
                    messageListenerContainer.setDestinationName(queueName);
                    messageListenerContainer.setMessageListener(this);
                    messageListenerContainer.start();
                    taskMap.put(triggerUid, messageListenerContainer);
                }
            }
        }
    }
}
```



```

/*
 * Cancel all the tasks and clear the map.
 */
@stopAllTriggers
public void stopAllTriggers() {
    taskMap.forEach((k, v) -> {
        v.stop();
        taskMap.remove(k);
    });
}

/*
 * Cancel the task and remove from the map
 *
 * @param triggerUid
 */
@stopListen
public void stopListen(String triggerUid) {
    taskMap.get(triggerUid).stop();
    taskMap.remove(triggerUid);
}

public String getTriggerUid() {
    return triggerUid;
}

public void setTriggerUid(String triggerUid) {
    this.triggerUid = triggerUid;
}

public Runnable getRunnable() {
    return runnable;
}

public void setRunnable(Runnable runnable) {
    this.runnable = runnable;
}
}

```

Add an iterator in a custom package for `Loop` action

Add an iterator in your package for **Loop** action.

Add an iterator to a Loop action

- To create an iterator, set `commandType` property of `BotCommand` annotation with value as `Iterator`.
- There are two methods required by iterator, and they are defined by `HasNext`, and `Next` annotations.

```

@BotCommand(commandType = BotCommand.CommandType.Iterator)
@CommandPkg(name = "loop.iterators.files",
    label = "For each file in folder",
    node_label = "for each file and assign file name and extension to",
    {{returnTo}}",
    description = "Iterator for each file in folder.",
    return_type = DataType.DICTIONARY,
    return_sub_type = DataType.STRING,
    return_required = true,
    return_description = "Note: Access the 'name' key to access file",
    name and 'extension'

```

```

        key to access the file extension.",
        return_label = "Assign file name and extension to this variable")
public class FileLoop extends AbstractCommandFileIterator {

    @Idx(index = "1", type = AttributeType.TEXT)
    @Pkg(label = "Folder path")
    @Inject
    @NotEmpty
    private String folderPath;

    @HasNext
    public boolean hasNext() {
        return getFileIterator(folderPath).hasNext();
    }

    @Next
    public Value<?> next() {
        Map<String, Value> returnValueMap = new HashMap<>();

        FileIterator fileIterator = getFileIterator(folderPath);
        String fileName = fileIterator.getNext();

        returnValueMap.put(FILE_NAME, new
StringValue(fileIterator.getFileName(fileName)));
        returnValueMap.put(EXTENSION, new
StringValue(fileIterator.getExtension(fileName)));

        return new DictionaryValue(returnValueMap);
    }

    public void setFolderPath(String folderPath) {
        this.folderPath = folderPath;
    }
}

```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Add debug logs of custom packages to bot_launcher.log file

You can add logs using log4j. The dependency is already added in the sample build.gradle file.

```

@BotCommand
@CommandPkg(label = "Copy to", icon="assigntoclipboard.svg" ,name =
"assignToClipboard", description
= "Accepts user input or a variable and assigns it to Clipboard",
node_label="{{value}}")
public class AssignToClipboard {

    private static Logger logger =
    LogManager.getLogger(AssignToClipboard.class);

    @Execute
    public static void assign(@Idx(index = "1", type = TEXT) @Pkg(label =
"Value") @NotEmpty String
value) {

        logger.trace("Assigning '{}' value to clipboard.", value);
    }
}

```

Handle sessions in a custom package

You can extract a session using a session name from the `SessionsMap`.

You can retrieve the `SessionsMap` using the `Sessions` attribute.

- The annotation can only be applied to the class field and a corresponding public setter is expected.
- The variable must be of type `Map<String, Object>`.

Example:

```
@BotCommand
@CommandPkg(label = "Start session", name = "startSession", description =
    "Start new session",
    icon = "pkg.svg", node_label = "start session
    {{sessionName}}|") public class Start {

    @Sessions
    private Map<String, Object> sessions;

    @Execute
    public void start(@Idx(index = "1", type = TEXT) @Pkg(label = "Session
    name",
        default_value_type = STRING, default_value = "Default") @NotEmpty String
    sessionName) {

        // Check for existing session
        if (sessions.containsKey(sessionName))
            throw new
BotCommandException(MESSAGES.getString("xml.SessionNameInUse",
    sessionName));

        // Do some operation

        // Create new session
        sessions.put(sessionName, new Session(operation));

    }

    public void setSessions(Map<String, Object> sessions) {
        this.sessions = sessions;
    }
}
```

```
@BotCommand
@CommandPkg(label = "End session", name = "endSession", description = "End
    session", icon =
    "pkg.svg", node_label = "End session {{sessionName}}|")
public class EndSession {

    @Sessions
    private Map<String, Object> sessions;

    @Execute
    public void end(
        @Idx(index = "1", type = TEXT) @Pkg(label = "Session name",
        default_value_type = STRING,
        default_value = "Default") @NotEmpty String sessionName) {

        sessions.remove(sessionName);
    }
}
```

```

    }

    public void setSessions(Map<String, Object> sessions) {
        this.sessions = sessions;
    }
}

```

Related concepts

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Annotations

This section provides reference information about the annotations used to create Automation Anywhere packages.

[Creation and function annotations](#) on page 1016 List of the available creation and function annotations.

[Validation annotations](#) on page 1019 Validates annotated strings and values used in the Java code.

Related concepts

[Standard coding practices and guidelines for developing packages](#) on page 993

This topic covers standard coding practices and guidelines that help to ensure the development of high quality packages.

[How to examples](#) on page 996

This section contains code examples and explanations about how to code some basic bot capabilities.

Related tasks

[Setting up the Java project](#) on page 990

Set up an Integrated Develop Environment (IDE) for Java, including Automation Anywhere custom annotations to enable the development of action packages that can be uploaded to your Enterprise Control Room.

[Develop a sample package](#) on page 995

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

Creation and function annotations

List of the available creation and function annotations.

Annotation	Description
BotCommand	Makes the type eligible to be treated as an action. You can define 3 types of actions commandType property. • Command\Action • Condition • Iterator Examples: • <code>@BotCommand(commandType = BotCommand.CommandType.Iterator)</code> • <code>@BotCommand(commandType = Condition)</code>
CommandPkg	Makes the type eligible for creation of action package.json. This annotation must be used with BotCommand to take effect. Pkg participates in the activity only when this annotation is present. Example: <pre>@CommandPkg(label = "Create", name = "createFile", description = "Creates a file", node_label = "{{filePath}}", icon = "file.svg")</pre>
ConditionTest	Participates in the Condition execution. This annotation can only be used when the BotCommand has commandType set as Condition. Only one method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error.

Annotation	Description
Execute	Participates in the execution of BotCommand. Exactly one method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error. Example: <pre>@Execute public void create(@Idx(index = "1", type = FILE) @LocalFile @Pkg(label = "File", description = "e.g. C:\ MyDoc\MyFile.doc") @NotEmpty String filePath, @Idx(index = "2", type = CHECKBOX) @Pkg(label = "Overwrite an existing file") @NotEmpty Boolean isOverwrite) { createFile(filePath, isOverwrite); }</pre>
GlobalSessionContext	Can only be applied to member variables and fetches the GlobalSessionContext through a setter. Example: <pre>@com.automationanywhere.commandsdk.annotation private GlobalSessionContext globalSessionContext; public void setSessionMap(Map < String, Object > sessionMap) { this.sessionMap = sessionMap; } public void setGlobalSessionContext (com.automationanywhere globalSessionContext) { this.globalSessionContext = globalSessionContext; }</pre>
HasNext	Participates in the execution of Iterator. This annotation can only be used when the BotCommand has commandType set as Iterator. Requires the Next annotation to be present. One method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error.
Idx	Makes the annotated element part of hierarchy utilized for the code and resource generation. Without this annotation no BotCommand related element annotations would be processed.

Annotation	Description
Idx.Option	An option represents the elements that would play in the hierarchy, but lend the values to the parents. Examples: - RADIO <pre> @Idx(index = "1", type = RADIO, options = { @Idx.Option(index = "1.1", pkg = @Pkg(node_label = "[[Delay.delayType.1.1.node_label]]", label = "[[Delay.delayType.1.1.label]]", value = REGULAR)), @Idx.Option(index = "1.2", pkg = @Pkg(node_label = "[[Delay.delayType.1.2.node_label]]", label = "[[Delay.delayType.1.2.label]]", value = RANDOM)) }) @Pkg(label = "[[Delay.delayType.label]]", default_value = "REGULAR", default_value_type = DataType.STRING) @Inject private String delayType; </pre> - SELECT <pre> @Idx(index = "2", type = SELECT, options = { @Idx.Option(index = "2.1", pkg = @Pkg(label = "[[LaunchWebsite.browser.2.1.label]]", value = "DEFAULT")), @Idx.Option(index = "2.2", pkg = @Pkg(label = "[[LaunchWebsite.browser.2.2.label]]", value = "INTERNET_EXPLORER")), @Idx.Option(index = "2.3", pkg = @Pkg(label = "[[LaunchWebsite.browser.2.3.label]]", value = "FIREFOX")), @Idx.Option(index = "2.4", pkg = @Pkg(label = "[[LaunchWebsite.browser.2.4.label]]", value = "CHROME")) }) @Pkg(label = "[[LaunchWebsite.browser.label]]", default_value = "DEFAULT", default_value_type = DataType.STRING) @NotEmptyStringbrowser) </pre>

Annotation	Description
Inject	Makes an element eligible for injection into the annotated type object. The injection is setter-based so a corresponding setter in the type is mandatory . The injected values would form the BotCommand parameter map using the name provided in Idx .
Next	Participates in the Iterator execution. This annotation can only be used when the BotCommand has <code>commandType</code> set as Iterator . Requires the <code>HasNext</code> annotation to be present. One method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error.
Pkg	Makes an element to participate in the <code>package.json</code> creation. This annotation is ignored when Idx is not present.

Related concepts

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

Validation annotations

Validates annotated strings and values used in the Java code.

Annotation	Description
CodeType	The MIME-type of the code to format.
CredentialOnly	Can only accept a credential value, no plain string allowed.
Equals	Validates the given string is equal to annotated string variable.
FileExtension	Validates the annotated string value that ends with the supported extension type.
GreaterThan	Validates that the annotated number variable value is always greater than the given numeric value.
GreaterThanEqualTo	Validates that the annotated number variable value is always greater than or equal to the given numeric value.
LessThan	Validates that the annotated number variable value is always less than the given numeric value.

Annotation	Description
LessThanOrEqualTo	Validates that the annotated number variable value is always less than or equal to the given numeric value.
LocalFile	Can only accept local paths and no file expression.
MatchesRegex	Validates that the annotated string value matches the given regular expression.
NotEmpty	Validates and throws an exception when the annotated variable value is null. <pre>@Execute public Value<Double>length (@Idx (index="1", type=TEXT) @Pkg (label="Source string") @NotEmpty String sourceString) {}</pre>
NotEquals	Validates that the given string is not be equal to the annotated string variable.
NotMatchesRegex	Validates that the annotated string value does not match the given regular expression.
NumberInteger	Ensures the UI accepts only integers and not double for the annotated variable value.
RepositoryFile	Can only accept repository paths and no file expression.
VariableNotPackage	Cannot choose a variable from this package.
VariablePackage	Can only choose a variable from this package.
VariableSubType	The variable subtype must match.
VariableType	The variable type must match.
VariableUserDefined	Can only choose a user-defined variable.

Related concepts

[Annotations](#) on page 1015

This section provides reference information about the annotations used to create Automation Anywhere packages.

Build and test a demo package and bot

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Here is a list of all the necessary tasks to create a package, add the package to your Enterprise Control Room, and verify your work in a bot. Complete the listed tasks in order.



Tip: Click the title of each step to go the detailed task.

Step 1 Update related workflow and build files on page 1021	Follow the detailed steps for updating workflow and build files for this project using your integrated development environment (IDE).
Step 2 Choose your favorite IDE	You can compile a package from the IDE of your choice. Here are two possible ways you can compile a package: Compile a demo JAR file from the Eclipse UI on page 1022 Use Eclipse to compile a demo JAR file that you can add as a package to your Enterprise Control Room. Compile a demo JAR file from the command line on page 1023 Compile the demo Java code provided with this software development kit.
Step 3 Add your demo package to an Enterprise Control Room on page 1023	Users with Upload package permission can add packages to the Enterprise Control Room for use by all Bot Creators.
Step 4 Create a demo bot with the demo package on page 1024	Create a bot using the demo package to verify the actions that were created.
Step 5 Change the Java file used to create the package JAR file on page 1024	Modify and compile the Java code used to create a package to fix issues and create new functionality.
Step 6 Upload new demo package on page 1025	Package management allows you to upload package updates. The new package has the same name, but a different version number.
Step 7 Update the demo bot with the updated package on page 1025	Update bots to use specific package versions.

Update related workflow and build files

Follow the detailed steps for updating workflow and build files for this project using your integrated development environment (IDE).

Complete all the steps for project setup detailed in [Setting up the Java project](#) on page 990.

This task shows you how to update the appropriate build and workflow files.

1. Open the project "A2019DemoPackage" that you created in [Setting up the Java project](#) on page 990.
You can find the project file in the directory where you extract the zip files to, for example c:\A2019DemoPackage.
2. From inside the project, Open the settings.gradle file.
3. Replace the project name with A2019DemoPackageFirstnameLastname.
If your name is John Developer it would look like this, A2019DemoPackageJohnDeveloper.
4. Open src > main > resources > package.template.

5. Update the name, label, and description values.

Original package.template	Updated package.template
<pre>{ "name": "A2019DemoPackage", "label": "A2019DemoPackage", "description": "Provides actions for A2019DemoPackage operations.", "group": "", "artifactName": "", "packageVersion": "", "codeVersion": "", "commands": [] }</pre>	<pre>{ "name": "A2019DemoPackageFirstnameLastname", "label": "A2019DemoPackageFirstnameLastname", "description": "A2019DemoPackageFirstnameLastname", "group": "", "artifactName": "", "packageVersion": "", "codeVersion": "", "commands": [] }</pre>



Tip: The package template file controls the following names and labels of your package.

- "name" is the JAR file name
Package file naming conventions:
 - No spaces
 - No special characters
- "label" is what appears in the Action panel of your Enterprise Control Room

6. Save the changes.

After you have setup the build files, you need to compile the demo Java code, [Compile a demo JAR file from the command line](#) on page 1023.

Compile a demo JAR file from the Eclipse UI

Use Eclipse to compile a demo JAR file that you can add as a package to your Enterprise Control Room.

Before starting this task complete the steps in [Update related workflow and build files](#) on page 1021.

Build a package file using a Gradle project in the Eclipse IDE.

1. Import the A2019DemoPackage as a Gradle project, File > Import > Gradle > Existing Gradle Project and click Finish.
2. From the Gradle Tasks tab, go to <your project> > build and run the following tasks in order.
 - a) <your project> > build > clean
 - b) <your project> > build > build
3. From the Gradle Tasks tab, go to <your project. > shadow and run the shadowJar task.
Your compiled package file is located in file:\ \A2019DemoPackage\build\libs\. The package file has named after your project name (<your project>-1.0.0.jar).

To add your custom package to your Enterprise Control Room follow the instructions in [Add packages to the Enterprise Control Room](#) on page 1098.

Related concepts

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Compile a demo JAR file from the command line

Compile the demo Java code provided with this software development kit.

Before starting this task complete the steps in [Update related workflow and build files](#) on page 1021.

1. Open a terminal window and go to where the gradlew.bat file is located.
...\\A2019DemoPackage > gradlew.bat
2. In the terminal window, type gradlew.bat clean build shadowJar, and press Enter. Here is an example of what you see:

```
> . . . \\A2019DemoPackage>gradlew.bat clean build shadowJar

> Task :compileJava
Note: Starting hierarchy discovery for
'com.automationanywhere.botcommand.demo.Concatenate'
Note: Starting non-hierarchical element discovery for
'com.automationanywhere.botcommand.demo.Concatenate'
Note: Starting hierarchy discovery for
'com.automationanywhere.botcommand.demo.Uppercase'
Note: Starting non-hierarchical element discovery for
'com.automationanywhere.botcommand.demo.Uppercase'
Note: Starting Command Java generator...
Note: Starting Json generator...
Note: Generating command json for Concatenate
Note: Generating command json for Uppercase

> Task :commandCodeGen
mergeJsonFiles: updatePackage: group com.automationanywhere ,
artifactName A2019DemoPackageFirstnameLastname ,
packageVersion 1.0.0-20190816-101906
```

The compiled file is located in file:\\A2019DemoPackage\\build\\libs\\.

To add your custom package to your Enterprise Control Room follow the instructions in [Add packages to the Enterprise Control Room](#) on page 1098.

Related concepts

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Add your demo package to an Enterprise Control Room

Users with Upload package permission can add packages to the Enterprise Control Room for use by all Bot Creators.

Before you can upload a package, you need valid user login credentials with Upload package permission for the Enterprise Control Room you are adding the package to.

1. Navigate to Bots > Packages.
2. Click Add package.
3. Click Browse.
4. Locate and select the package to add to the control room.
Packages are Java Archive (JAR) files that contain actions used to create bots.
5. Click Upload package.
6. On the Bots > Packages > Confirm package page, choose any of the following options:

Option	
Reject	Stops the upload process.
Accept, enable and set as default	Uploads and enables the selected package, and setting it to the default package for the Enterprise Control Room.
Accept and enable	Uploads and enables the package, but the package is not set as the default package. Bot Creators have to specifically select non-default packages to use them for creating bots.

After successfully uploading your demo package, create a bot to test the actions you just created. For detailed step about how to create a bot, read [Create a demo bot with the demo package](#) on page 1024

Create a demo bot with the demo package

Create a bot using the demo package to verify the actions that were created.

Here are the minimum prerequisites for building this demo bot:

- Access to a Control Room
- User credentials with AAE_Basic permission
- Your local host (workstation) is a registered device in the Control Room
- Ensure that the demo package A2019DemoPackageFirstnameLastname is available in the Enterprise Control Room

This task uses the following actions and components:

- Uppercase (demo package)
- [Message box](#)
- [Variables overview](#) on page 866

1. Go to Bots > My bots and click the My Task Bot icon.
2. Type MyDemoBot1 in the Name field.
3. Click Create & Edit.
4. Expand A2019DemoPackageFirstnameLastname and double Uppercase.
5. Type hello world, go be great! in all lower case letters.
6. Create the variable vMyDemoVar1.
7. Click Apply.
8. Add a Message box and insert the variable vMyDemoVar1 in the Enter the message to display field.
9. Click Apply and Save.
10. Click the Run icon.

A message box with "HELLO WORLD, GO BE GREAT!" in all upper case letters is displayed. The custom action Uppercase converted all the letters from lower case letters to upper case letters.

The task, [Change the Java file used to create the package JAR file](#) on page 1024, gives instruction on how to modify the Uppercase action to convert all upper case letters to lower case letters.

Change the Java file used to create the package JAR file

Modify and compile the Java code used to create a package to fix issues and create new functionality.

1. Open the project "A2019DemoPakcage."

- From inside the project, open `src/main/java/com.automationanywhere.botcommand.samples.commands/basic/Uppercase`.
- Change the function from upper case to lower case.

Original function	Updated function
<pre>String result = "ALL".equals(caseType) ? sourceString.toUpperCase() : (sourceString .substring(0, 1).toUpperCase() + sourceString .substring(1));</pre>	<pre>String result = "ALL".equals(caseType) ? sourceString.toLowerCase() : (sourceString .substring(0, 1).toUpperCase() + sourceString .substring(1));</pre>

- Save the changes and re-compile the package.

You can now upload the changed package to the Enterprise Control Room. [Upload new demo package](#) on page 1025

Related tasks

[Upload new demo package](#) on page 1025

Package management allows you to upload package updates. The new package has the same name, but a different version number.

Upload new demo package

Package management allows you to upload package updates. The new package has the same name, but a different version number.

You need AAE_Basic permissions to create and edit bots.

- From the Bots > Packages page, click the Add package icon.
- Browse to the location of the package to add.
Packages are Java Archive (JAR) files that contain actions used to create bots.
- Select the package to add, and click Upload package.
- On the Bots > Packages > Confirm package page, click Accept, enable and set as default.

You can select specific packages to be used from within a bot. Read detailed steps about managing packages for specific bots in [Update the demo bot with the updated package](#) on page 1025 task.

Update the demo bot with the updated package

Update bots to use specific package versions.

- Access to the bot created in the task [Create a demo bot with the demo package](#) on page 1024.
- AAE_Basic permission.

- Go to Bots > My bots and double-click MyDemoBot1, the demo bot you created in an earlier task.
- Click the vertical eclipses in the upper right corner and click Packages.
- Expand the row for the package A2019DemoPackageFirstnameLastname.
- From the drop-down list of package versions, select the Default version.

Because you added the updated package as the default version, you are selecting the new version of the package you created.

5. Click Change Version and Save.
6. Go to Bots > My bots and double-click MyDemoBot1.
7. Click A2019DemoPackageFirstnameLastname and type HELLO WORLD, GO BE GREAT! in the Source string field.
8. Click Apply and Save.
9. Click the Run icon.
The message box displayed by the bot displays "hello world, go be great!" This verifies that the action from the updated package is being used.

Build and test a custom package

Use IntelliJ to build a custom package and use Enterprise A2019 actions to test the package.

Complete the following tasks to create a custom package, upload the package to your Enterprise Control Room, and build a bot to test it. After you update the IntelliJ files, create directories, and create and update java classes, you can build the custom package.

1. [Create and build a custom package using IntelliJ](#) on page 1026
Use IntelliJ to import the Automation Anywhere SDK, create a new package, and compile a JAR file that you can upload to your Enterprise Control Room.
2. [Add custom package to your Enterprise Control Room](#) on page 1029
Use the compiled JAR file and upload it to the Enterprise Control Room.
3. [Create a bot to test the custom package](#) on page 1030
Use Enterprise A2019 actions to create a bot to test the custom package.



See also: [Create custom packages](#)

Create and build a custom package using IntelliJ

Use IntelliJ to compile a JAR file that you can upload as a package to your Enterprise Control Room in Enterprise A2019.

A basic understanding of JDK and Java IntelliJ is required in order to build an action package. You require the following software and files:

- [Java SE Development Kit 11 Downloads](#)
 - Java IDE [Community edition of IntelliJ](#)
 - Automation Anywhere A2019 SDK. Download and extract the zip files for the release you require: [Enterprise A2019 Package Development Kit Release Notes](#)
1. Unzip the contents of the SDK package to your `IdeaProjects` directory and rename the folder from `A2019.10-package-sdk-1.0.0` to `MetricToImperial`.
By default, the package is located at: `C:\Users\<User>\IdeaProjects`.
 2. In IntelliJ IDEA, go to File > Open and open the project at `C:\Users\<User>\IdeaProjects\MetricToImperial`.
 3. Open the `settings.gradle` file in the project root. Set the `rootProject.name = 'MetricToImperial'`
 4. Update the `package.template` file located at `src > main > resources > package.template`.
 5. Change the package name from `A2019DemoPackage` to `MetricToImperial`.
 6. Update the package name in `locales.json`: go to `src > main > resources > locales > en_US.json`.

- a) Open the en_US.json file and update the required label field. Update the optional description.

Original en_US.json	Updated en_US.json
<pre>{ "label" : "A2019DemoPackage", "description" : "Provides actions for A2019DemoPackage operations." }</pre>	<pre>{ "label" : "Metric To Imperial", "description" : "Converts lengths and distances from Metric format to Imperial format" }</pre>

- b) Delete all other remaining lines in the en_US.json file.
7. Create a new Java Class, right-click the metrictoimperial.commands package, and select New > Java Class. Enter the name for the new class CMtoINCH:
- a) Open the CMtoINCH class. Copy and paste the following code above the class definition statement:

```
import static com.automationanywhere.commandsdk.model.DataType.NUMBER;
//BotCommand makes a class eligible for being considered as an action.
@BotCommand
//CommandPks adds required information to be dispalable on GUI.
@CommandPkg(
    //Unique name inside a package and label to display.
    name = "CM to Inch", label = "[[CMtoINCH.label]]",
    node_label = "[[CMtoINCH.node_label]]", description =
    "[[CMtoINCH.description]]", icon = "ruler_icon.svg",
    //Return type information. return_type ensures only the right
    kind of variable is provided on the UI.
    return_label = "[[CMtoINCH.return_label]]", return_type =
    NUMBER, return_required = true)
```

- b) Inside the CMtoINCH class, copy and paste the following code:

```
//Identify the entry point for the action. Returns a Value<String>
because the return type is String.
@Execute
public NumberValue action(
    //Idx 1 would be displayed first, with a text box for entering
    the value.
    @Idx(index = "1", type = AttributeType.NUMBER)
    //UI labels.
    @Pkg(label = "[[CMtoINCH.CMInput.label]]")
    //Ensure that a validation error is thrown when the value is
    null.
    @NotEmpty
    Double CMInput) {
    //Internal validation, to disallow empty inputs. No null check needed
    as we have NotEmpty on CMInput.
    if ("".equals(CMInput.toString().trim()))
        throw new BotCommandException("Input of CM is required");
    Number result;
    try {
        //Conversion logic
        result = CMInput * 0.393701;
```



```

    } catch (Exception e) {
        //Throw custom error message
        throw new BotCommandException("Unable to convert " +
            CMInput.toString() + "cm to inches");
    }
    //Return NumberValue.
    return new NumberValue(result);

```

The code automatically imports namespaces based on the annotations and datatypes.

To manually import namespaces, select a highlighted line, and press these keys simultaneously alt and the enter key.

8. Go to src > main > resources > locales > en_US.json and add the following fields after the label and description values:

```

"CMtoINCH.label" : "cm to inches",
"CMtoINCH.node_label": "cm to inches",
"CMtoINCH.description" : "Convert centimeters to inches",
"CMtoINCH.return_label" : "Assign the Output in Inches to a Number Variable",
"CMtoINCH.CMInput.label" : "Centimeters to Convert to Inches"

```

9. Go to src > main > java > com.automationanywhere.botcommand, and delete the samples.commands package. Additionally, delete the samples package.
10. Update the CommandPkg annotation.
 - a) Download ruler_icon.svg from [github](#) and right-click the image and save the image as ruler_icon.svg.
 - b) Download iconwhite.svg from [github](#), right-click the image and save the image iconwhite.svg.
 - c) Copy both the files into the src > main > resources > icons folder.
11. Open the build.gradle in the project root. After the dependencies section, but before the last closing tag, copy and paste the following code:

```

test {
    testLogging {
        exceptionFormat = 'full'
    }
    useTestNG() {}

    afterSuite { desc, result ->
        if (!desc.parent)
            println("${result.resultType} " +
                "${result.testCount} tests, " +
                "${result.successfulTestCount} successes, " +
                "${result.failedTestCount} failures, " +
                "${result.skippedTestCount} skipped)")
    }
    maxHeapSize "3g"
}

```

12. In the project explorer, right-click src and select New > Directory.
 - a) In the Name field, enter test\java, or select the test\java suggestion from the Gradle Source Sets.
 - b) Right-click the java directory and select New > Package.
 - c) Enter the name for the newly created package:
com.automationanywhere.botcommand.metrictoimperial.commands.

- d) Right-click the new package and select New > Java Class. Enter the name for the new class CMtoINCHTest.

13. Inside the CMtoINCHTest class, copy and paste the following code:

```
@Test
public void testCMtoINCH() {
    Double validInput = 10.00;
    Double expectedOutput = 0.393701 * validInput;
    CMtoINCH testCM = new CMtoINCH();
    Value<Double> result = testCM.action(validInput);
    Assert.assertEquals(result.get(), expectedOutput);
}
```

14. Save the project File > Save All.

15. Build the package.

You can use the IntelliJ UI or the command line. If you are using the command line:

- a) Open a terminal window and navigate to the MetricToImperial directory and enter: `cd "%USERPROFILE%\IdeaProjects\MetricToImperial"`
- b) To build the project, enter the following command: `gradlew.bat clean build shadowJar`

A BUILD SUCCESSFUL message appears.

Sometimes a build might fail because existing files could not be automatically deleted and a system message appears indicating the execution failed for the task: `clean`. If this occurs, close the explorer windows and run the build again.

[Add custom package to your Enterprise Control Room](#) on page 1029

Add custom package to your Enterprise Control Room

Use the compiled JAR file and upload it as a package to your Enterprise Control Room in Enterprise A2019.

- Complete the steps in [Create and build a custom package using IntelliJ](#) on page 1026.
 - Ensure you have the following:
 - Access to the Enterprise Control Room.
 - Credentials with AAE_Bot Store Publisher permission.
1. From Windows Explorer, go to `C:\Users\<Username>\IdeaProjects\MetricToImperial\build\libs` and locate `MetricToImperial-1.0.0.jar`.
 2. Log in to your Enterprise Control Room as a user with permissions to add a new package.
 3. Click BOTS > Packages.
 4. In the All packages page, move your mouse over the plus sign and click Add package.
 5. In the Add package page, click Browse and locate the `MetricToImperial-1.0.0.jar` file. By default, the file is located at: `C:\Users\<Username>\IdeaProjects\MetricToImperial\build\libs`.
 6. Select the `MetricToImperial-1.0.0.jar` file and click Open.
 7. Click Upload Package.

[Create a bot to test the custom package](#) on page 1030

Related concepts

[Build and test a custom package](#) on page 1026

Use IntelliJ to build a custom package and use Enterprise A2019 actions to test the package.

Related tasks

[Add custom package to your Enterprise Control Room](#) on page 1029

Use the compiled JAR file and upload it as a package to your Enterprise Control Room in Enterprise A2019.

[Create a bot to test the custom package](#) on page 1030

Use the actions in Enterprise A2019 to create a bot and test the custom package.

Create a bot to test the custom package

Use the actions in Enterprise A2019 to create a bot and test the custom package.

Ensure you have the following to build the bot:

- Access to the Enterprise Control Room.
 - Credentials with AAE_Bot Store Publisher permission.
 - Your workstation is a registered device in the Enterprise Control Room.
 - Your package MetricToImperial-1.0.0.jar is available in the Enterprise Control Room.
1. Log in to the Enterprise Control Room.
 2. Go to Bots > My bots, and click the Create a bot icon.
 3. In the Name field, enter `MetricToImperialTest`.
 4. Click Create & Edit.
 5. In the Actions pane, find Metric to Imperial and drag Convert centimeters to inches into the bot flow.
 - a) In the CM to Convert field, enter 1.
 - b) Click Create variable (next to the Output field) to create a new number variable.
 - c) In Create Variable, enter `nInchesOutput` and click Create & Select.
 - d) Click Apply.
 6. In the Actions pane, find the Number package and drag the To String command below Convert centimeters to inches.
 - a) In the Enter a number field, enter F2 and select `nInchesOutput`.
 - b) In the Enter number of digits after decimal field, enter 5.
 - c) In the Assign the output to variable field, select prompt-assignment - String from the drop-down list.
 - d) Click Apply.
 7. From the Actions pane, drag Message box, click F2 and insert the prompt-assignment variable.
 8. In the Enter the message to display field, click F2 and select the prompt-assignment variable.
 9. Click Apply and Save.
 10. Click Run.

The bot displays the 0.39370 message, which is a successful build.

Related concepts

[Build and test a custom package](#) on page 1026

Use IntelliJ to build a custom package and use Enterprise A2019 actions to test the package.

Related tasks

[Create and build a custom package using IntelliJ](#) on page 1026

Use IntelliJ to compile a JAR file that you can upload as a package to your Enterprise Control Room in Enterprise A2019.

[Add custom package to your Enterprise Control Room](#) on page 1029

Use the compiled JAR file and upload it as a package to your Enterprise Control Room in Enterprise A2019.

Enterprise A2019 Package Development Kit Release Notes

These release notes describe new, changed, fixed, deprecated features, and security fixes, as well as known issues and limitations for the Enterprise A2019 Package Development Kit.

Enhancements A2019.19

Feature	Description
Runtime library updates	Bundled latest bot runtime libraries.
Added annotation rule	Added the <code>MultipleRecordPicker</code> annotation rule.
Added annotations	Added annotations for desktop operation stages.

[A2019-package-sdk-2.0.8](#)

Enhancements A2019.18

Feature	Description
Runtime library updates	Bundled latest bot runtime libraries.
Added shared session	Added support for shared sessions.
Enhanced property creation	Now properties can accept one parameter.
Added rule for WindowResize and WindowBrowser	Added a new rule for WindowResize and WindowBrowser.
Non-essential dependencies in the <code>build.gradle</code> are commented out	Non-essential dependencies in the <code>build.gradle</code> are now commented out. Enable it to compile the Package SDK samples.

[A2019-package-sdk-2.0.7](#)

Enhancements A2019.17

Feature	Description
Runtime library updates	Bundled latest bot runtime libraries.
Add the author name in custom packages	Added support to add the author name in the vendor column of custom packages.
Added File2 attribute	Added the new attribute type File2.
Added File Type rule	Added the new rule File Type.

[A2019-package-sdk-2.0.6](#)

Enhancements A2019.16

Feature	Description
Runtime library updates	Bundled latest bot runtime libraries.
Added NoLogging	Added NoLogging support.

[A2019-package-sdk-2.0.5](#)

Enhancements A2019.15

Feature	Description
Runtime library updates	Bundled latest bot runtime libraries.

[A2019-package-sdk-2.0.4](#)

Enhancements A2019.14

Feature	Description
Desktop operations	Added desktop operations support.
Samples for actions in the download file	Added additional samples for actions in the Package SDK download file.
Runtime library updates	Bundled latest bot run-time libraries.

[A2019-package-sdk-2.0.3](#)

Enhancements A2019.13

Feature	Description
Time validation for locales	Added compile time validation for locales JSON file.
Entry list	Added support for ENTRYLIST
Runtime library updates	Bundled latest bot runtime libraries.

[A2019-package-sdk-2.0.2](#)

Enhancements A2019.12.1

Feature	Description
Trigger samples	Added trigger samples in the Package SDK download file. Download the latest Package SDK to access the sample files.

[A2019-package-sdk-2.0.1.zip](#)

Enhancements A2019.12

Feature	Description
Runtime libraries	Added the latest runtime libraries.
Custom trigger	Creating custom triggers is supported in this release.
Sample	We added more code samples.
HierarchyDemo.java code example added to package documentation. (Service Cloud case ID: 00469066)	Create a simple action with multiple choices. The UI differs based on the options selected.

[A2019-package-sdk-2.0.0.zip](#)

Enhancements A2019.11

Feature	Description
Runtime libraries	This package contains the latest runtime libraries.

[A2019-package-sdk-1.0.11.zip](#)

Enhancements A2019.10

Feature	Description
Updated annotation support	Added new attributes annotation support.
Improved bundling of SDK	Bundled java doc inside package SDK zip. You only need to download one zip file now.
Runtime libraries	Bundled latest bot runtime libraries.
More examples	Added new examples inside zip.
Datatypes	Added new datatypes.

[A2019.10-package-sdk-1.0.0.zip](#)



Note: All the components for the Package SDK are included in a single zip file starting with the A2019.10 release.

Enhancements A2019.09

Feature	Description
Bot runtime libraries	Bundled latest bot runtime libraries for A2019.09 Package SDK.

- SDK Demo Package: [A2019.09-packageSDK-1.0.0.zip](#)
- Documentation: [A2019.09-package-annotations-javadoc.zip](#)

Enhancements A2019.08

Feature	Description
Bot runtime libraries	Bundled latest bot runtime libraries for A2019.08 Package SDK.
Properties support	Extended support for properties.
Comments expanded and improved	Added more comments to sample commands to help use SDK.
Comment field formatting	Added text color and background color to comment fields.

- SDK Demo Package: [A2019.08-packageSDK-1.0.0.zip](#)
- Documentation: [A2019.08-package-annotations-javadoc.zip](#)

Enhancements A2019.07

Feature	Description
Bot runtime libraries	The A2019.07 bot runtime libraries are bundled in the SDK package.
CREDENTIAL attribute	We provide support for credential attributes that require input from action screens.
Localized error messages and actions UI text	Enables developing packages with i18n error messages and localized (l10n) actions UI with localized text.
Java Development Kit 11	The A2019.07 Package Development Kit supports JDK 11.

- SDK Demo Package: [A2019.07-Package-Sdk-1.0.0.zip](#)
- Documentation: [A2019.07-package-annotations-javadoc.zip](#)

Build a bot using REST Web Services and JavaScript actions

Use the Azure Cognitive Text Analytics API to get a subscription key and use the REST API and Enterprise A2019 JavaScript actions to build a bot.

Complete the following tasks to create a resource to get a subscription key, and use the Enterprise A2019 REST Web Services and JavaScript actions to build the bot. After you create a resource and deploy it, you will get a subscription key. Use the subscription key to create a variable and use Enterprise A2019 actions to build the bot.

1. [Set up the Azure portal](#)

Use the Azure Cognitive Text Analytics API to create a resource, get a subscription key, and then use a Reference API to send a POST request.

2. [Build a bot to parse JSON response using JavaScript](#) on page 1036

Use the subscription key created in the Microsoft Azure to build a bot to parse the JSON response using Enterprise A2019 REST Web Services and JavaScript actions.

Set up Azure portal

Use the Azure Cognitive Text Analytics API to create a resource, get a subscription key, and then use a Reference API to send a POST request.

Create an account with [Azure Cognitive Services](#).

1. Log in to your Azure account and click Portal.
2. Search and select Text Analytics from the drop-down list.
3. Click Create a Resource:
 - a) Enter a Name: `TextAnalyticsDemo2020`.
 - b) Select the Subscription--use the default `Azure subscription 1`, select the Location, for example `West US`, and select the Pricing tier, for example `F0 (5K Transactions per 30 days)`.
 - c) Create a Resource Group and provide a name, for example, `TextAnalyticsDemo2020RG`.
 - d) Click Create.
When the Overview window opens, you should be able to see the following status: `Your Deployment is complete`.
4. Go to your resource `TextAnalyticsDemo2020` and select it.
You should see: `TextAnalyticsDemo2020 | Quick Start`.
5. From section 1, copy the K1 contents, for example, `0abfa73d93f1469d9d4b5db459394315`.
The Text Analytics API (v.2.1) page opens.
6. From section 2, click the `API Console (V2)` link:
 - a) Select `API Reference > POST Sentiment`.
 - b) In Sentiment, select the testing console in the region where you created your resource:, select `West US`.
The Text Analytics API (v.2.1) Sentiment page opens.
 - c) In the Headers section, enter the value `Ocp-Apim-Subscription-Key` that you copied from the K1 field.
 - d) In the Request body, delete the existing content and replace it with the following code:

```
{
```



```
"documents": [
  {
    "language": "en",
    "id": "1",
    "text": "I love this world"
  }
]
```

e) Click Send.

The response status is displayed as 200 OK. The Response content field shows:

```
{ "documents": [{ "id": "1", "score": 0.96714282035827637 }], "errors":
[] }.
```

[Build a bot to parse JSON response using JavaScript](#) on page 1036

Build a bot to parse JSON response using JavaScript

Use the subscription key created in the Microsoft Azure to build a bot to parse the JSON response using Enterprise A2019 REST Web Services and JavaScript actions.

Ensure you have the following to build the bot:

- Created an account in the Azure portal and have the subscription key available.

[Set up Azure portal](#) on page 1035

- Access to the Enterprise Control Room or Community Control Room
- Your workstation is a registered device in the Enterprise Control Room.

1. Log in to the Enterprise Control Room.
2. Go to Bots > My bots, and click the Create a bot icon.
3. In the Name field, enter `API_Sentiment_Score_Bot`.
4. Click Create & Edit.
5. From the Actions pane, click Variables to create a new variable:
 - a) In the Name field, enter `sURI`.
 - b) In the Type field, select String.
 - c) In the Default value field, access your previously created resource and paste the value here:
<https://westus.api.cognitive.microsoft.com/text/analytics/v2.1/sentiment>.
 - d) Click Create.
6. Create a new Variable:
 - a) In the Name field, enter `sSubscriptionKey`.
 - b) In the Type field, select String.
 - c) In the Default value field, paste the value from the K1 field:
`0abfa73d93f1469d9d4b5db459394315`.
 - d) Click Create.
7. From the Actions pane, select REST Web Services > Post method and place it at the Start of the bot.
 - a) In the URI field, select `$$URI$` and click Yes, insert.
 - b) In the Authentication Mode drop-down list, select No Authentication.
 - c) Click Header > Custom Headers > (Add):

1. In the Name field, enter `Ocp-Apim-Subscription-Key`.
 2. In the Value field, select `$$SubscriptionKey$` and click Yes, Insert.
- d) In the Content type drop-down list, select `JSON (application/json)`.
 - e) In Custom Parameters, enter the following code:


```
{
  "documents": [
    {
      "language": "en",
      "id": "1",
      "text": "I love this world"
    }
  ]
}
```
 - f) Create a new `dResponse` variable of Type > Dictionary and Subtype > String.
 - g) In the Assign the output to a variable drop-down list, select `dResponse -Dictionary of Strings`.
 - h) Click Create & Select.
8. From the Actions pane, drag Message box to the bot. In the Enter the message to display field, select `dResponse -Dictionary of Strings`, and click Yes, insert.
 9. Create a new `sOutput` variable of Type > String.
 10. From the Action pane, click Dictionary > Get.
 - a) In the Dictionary variable drop-down list, select `dResponse -Dictionary`.
 - b) In the Key field, enter `Body`.
 - c) In the Assign the output to a variable drop-down list, select `sOutput -String`.
 11. Create a new `lParseOutput` variable of Type > List and Subtype > String.
 12. Create a new `sSentimentValue` variable of Type > String.
 13. From the Action pane, click List > Add item.
 - a) In the List variable drop-down list, select `lParseOutput -List`.
 - b) In the Item to be added drop-down list, select `sOutput -String`.
 - c) In the Add Item field, select `To end of list`.
 14. From the Action pane, click JavaScript > Open.
 - a) In the JavaScript session field, select `Default`.
 - b) In JavaScript, select Manual input and enter the following script:


```
function extractValue(list) {var output = JSON.parse(list);return
output.documents[0].score;}
```
 15. From the Action pane, click JavaScript > Run JavaScript.
 - a) In the JavaScript session, select `Default`.
 - b) In the Enter name of function to be executed, enter `extractValue`.
 - c) In the Parameters drop-down list, select `lParseOutput - List`.
 - d) In the Assign the output to variable drop-down list, select `sSentimentValue - String`.

16. From the Actions pane, drag Message box to your bot.
 - a) In the Enter the message to display field, enter: `Sentiment score: $$SentimentValue$`.
17. Click Save and click Run.
 The following message appears: `Your bot has run successfully!Sentiment score: 0.9671428203582764`

Post to Salesforce through custom app with OAuth 2.0

Create a Salesforce custom app to get authentication credentials and use the Enterprise A2019 REST Web Service and String Operation actions to build a bot. After creating the app, you will get the authentication credentials. Use the credential values to create variables and build a bot using the Enterprise A2019 actions.

1. [Create a custom app with OAuth 2.0 for authentication](#) on page 1038
 Create a custom app in Salesforce and get the access token to interact with REST APIs, and then use REST Web Service and String Operation actions to build a bot.
2. [Build a bot using REST web services and String actions](#) on page 1039
 Use the access token created in the custom app and build a bot using the REST Web Service and String Operation actions.

Create a custom app with OAuth 2.0 for authentication

Create a custom app in Salesforce and get the access token to interact with REST APIs.

Ensure you have the following to build the bot:

- A basic knowledge of REST API and an understanding of OAuth concepts.
- An account created in Salesforce and a user name and password available.

[Salesforce Developers](#)

1. Log in to Salesforce and click Switch to Lightning Experience.
2. Click your Profile image and click Settings.
3. On the left side, click Reset My Security Token.
 After resetting the token action, a new token is sent to your registered email.
4. Check your email and save the security token.
5. In the Salesforce application, click Home, and search and select App manager.
6. Click New Connected App:
 - a) In the Connected App Name field, enter `OAuth_Validation_App`.
 - b) In the Contact Email field, enter your email.
 - c) In the API section, select Enable OAuth Settings.
 - d) In the Callback URL field, enter `no:callbackURL`.
 - e) In the Selected OAuth Scopes, select Access and manage your data (api).
 - f) Click Add and verify that the Access and manage your data (api) is shown on the right side.
 - g) Click Save.
 A system message is displayed: `Allow from 2-10 minutes for your changes to take effect on the server before using the connected app.`

- h) Wait until the changes are applied and then click Continue.
7. When the OAuth_Validation_Apppage is displayed, go to the API section and copy the Consumer Key and Consumer Secret values. If it is hidden, select Click to reveal and copy the Consumer Secret key.
8. Click Manage and validate the OAuth Policies: verify that the Permitted Users field includes All users may self-authorize. If not, click Edit Policies and select All users may self-authorize.
9. Click Save.
You can build a bot using the values from the OAuth_Validation_App, such as, ClientId = Consumer Key, ClientSecret = Consumer Secret, SecurityToken, and your Salesforce user name and password.

[Build a bot using REST web services and String actions](#) on page 1039

Build a bot using REST web services and String actions

Use the custom app authentication to generate the access token to interact with Salesforce REST APIs and build a bot using the Enterprise A2019 REST Web Service and String Operation actions.

Ensure you have the following to build the bot:

- Created a connected app and credentials available.
[Create a custom app with OAuth 2.0 for authentication](#) on page 1038
 - Access to the Enterprise Control Room or Community Control Room
 - Your workstation as a registered device in the Enterprise Control Room.
1. Log in to the Enterprise Control Room.
 2. Go to Bots > My bots, and click the Create a bot icon.
 3. In the Name field, enter `ConnectToAPIwithOAuth`.
 4. Click Create & Edit.
 5. In the Actions page, click Variables to create a new variable:
 - a) In the Name field, enter `sClientId`.
 - b) In the Type field, select String.
 - c) In the Default value field, paste the value from the Consumer Key field of the OAuth validation app.
 - d) Click Create.
 6. Create a new `sClientSecret` variable, Type > String, Default value > Consumer Secret, paste the value.
 7. Create a new `sUserName` variable, Type > String, Default value > **enter the Salesforce login user name**.
 8. Create a new `sPassword` variable, Type > String, Default value > **enter the Salesforce login password**.
 9. Create a new `sSecurityToken` variable, Type > String, Default value > Security Token, paste the value.
 10. Create a new `dResponse` variable, Type > Dictionary and Subtype > String.
 11. Create a new `sExtractedValue` variable, Type > String.
 12. From the Actions pane, select REST Web Services > Post method and place it under the Start of the bot flow.
 - a) In the URI field, enter `https://ap17.salesforce.com/services/oauth2/token?grant_type=password&client_id=$sClientId&client_secret=`

`$sClientSecret&username=$sUsername&password=$sPassword$
$sSecurityToken$`. Replace ap17 with your Salesforce instance number.

- b) In the Authentication Mode drop-down list, select No Authentication.
 - c) In the Content type drop-down list, select JSON (application/json).
 - d) In the Assign the output to a variable drop-down list, select dResponse - Dictionary of Strings.
13. From the Actions pane, drag Message box to the bot flow. In the Enter the message to display field, enter `$dResponse{Body}$`.
 14. From the Action pane, click String > Extract Text.
 - a) In the Source string field, enter `$dResponse{Body}$`.
 - b) In the Before or after Start after text, enter "access_token":", Occurrence, enter 1, select AND, End before text, enter ", ", Occurrence, enter 1. If no match found, return, select Source String. Number of characters to get, select All, click Trim the extracted text (remove blank spaces), and click Remove Enter from the extracted text.
 - c) In the Assign the output to a variable drop-down list, select sExtractedValue - String.
 15. From the Actions pane, drag Message box to the bot flow. In the Enter the message to display field, enter `$sExtractedValue$`.
 16. From the Actions pane, select REST Web Services > Post method.
 - a) In the URI field, enter `https://ap17.salesforce.com/services/data/v36.0/subjects/Account`. Replace ap17 with your Salesforce instance number.
 - b) In the Authentication Mode drop-down list, select No Authentication.
 - c) Click Header > Custom Headers > (Add):
 1. In the Name field, enter Authorization.
 2. In the Value field, enter `Bearer $sExtractedValue$`.
 - d) In the Content type drop-down list, select JSON (application/json).
 - e) In Custom Parameters, enter the following code:


```
{
  "Name" : "Text passed through A2019 REST API"
}
```
 - f) In the Assign the output to a variable drop-down list, select dOutput -Dictionary of Strings.
 17. From the Actions pane, drag Message box. In the Enter the message to display field, enter `$dOutput{Body}$`.
 18. From the Action pane, select String > Extract text.
 - a) In the Source string field, enter `$dOutput{Body}$`.
 - b) In the Before or after Start after text, enter "id":", Occurrence, enter 1, select AND, End before text, enter ", ", Occurrence, enter 1. If no match found, return, select Source String, Number of characters to get, select All, click Trim the extracted text (remove blank spaces), and click Remove Enter from the extracted text.
 - c) In the Assign the output to a variable drop-down list, create a new sURLValue by clicking the plus sign, Type > String.
 - d) Click Create & Select.
 19. From the Actions pane, drag Message box. In the Enter the message to display field, enter `$sURLValue$`.

A message from the bot displays a URL value 0014R00002gIcsZQAS. Use the value to validate the data in your Salesforce account: `https://<yourinstance>.salesforce.com/<sURLValue>`. For example: `https://ap17.salesforce.com/0014R00002gIcsZQAS`.

Use Python to build a bot to parse JSON response

Use the Enterprise A2019 Python script to execute Python functions to build a bot. Use the Python functions to parse the JSON response from a REST Web Services GET request.

Ensure you have the following to build the bot:

- Basic understanding of Python programming language.
- Basic experience with creating Automation Anywhere bots.
- Download and install Python 3.

[download Python](#)

Add a path to the Environment variable, and select Add Python 3.8 to PATH during the Python installation.

1. Log in to the Enterprise Control Room.
2. Go to Bots > My bots, and click the Create a bot icon.
3. In the Name field, enter `PythonTutorial`.
4. Click Create & Edit.
5. In the Actions pane, click Variables to create the following new variables:
 - a) Name `dResponse`, Type > Dictionary and Subtype > String.
 - b) Name `dRetrieveValue`, Type > Dictionary and Subtype > Any.
 - c) Name `sResponseBody`, Type > String.
 - d) Name `sFullName`, Type > String.
 - e) Name `sLocation`, Type > String.
 - f) Name `sTotalUserCount`, Type > String.
 - g) Name `nTotalUserCount`, Type > Number.
 - h) Name `nCurrentUser`, Type > Number.
 - i) Name `sCurrentUser`, Type > String.
6. From the Actions pane, select REST Web Services > Get method and place it under the Start of the bot flow.
 - a) In the URI field, enter <https://randomuser.me/api/?results=5&inc=name,email,location&nat=us>. This is a sample API that returns random user details to the calling application.
 - b) In the Authentication Mode drop-down list, select No Authentication.
 - c) In the Assign the output to a variable drop-down list, select `dResponse` -Dictionary of Strings.
7. From the Actions pane, click String > Assign.
 - a) In the Select the source string variable value field, enter `$dResponse {Body} $`.
 - b) In the Assign the output to a variable drop-down list, select `dResponseBody` - String.
8. From the Actions pane, click Python script > Open.
 - a) In the Python field, select Manual input.

- b) In the Enter script here field, copy and paste the following code.

```
import json

def get_node_count(response):
    #parse response as json
    response_dict=json.loads(response)
    # Create list from JSON body
    response_body = response_dict['results']
    #return the count of entries in JSON body as string
    lengthasString = str(len(response_body))
    return lengthasString

def get_full_name(dictRequest):
    itemCount = int(dictRequest['count'])
    #parse response as json
    response_dict=json.loads(dictRequest['response'])
    # Create list from JSON body
    response_body = response_dict['results']
    #Extract values to return
    return response_body[itemCount]['name']['first'] + " " +
    response_body[itemCount]['name']['last']

def get_location(dictRequest):
    itemCount = int(dictRequest['count'])
    #parse response as json
    response_dict=json.loads(dictRequest['response'])
    # Create list from JSON body
    response_body = response_dict['results']
    #Extract values to return
    return response_body[itemCount]['location']['city'] + ", " +
    response_body[itemCount]['location']['state']
```

- c) In the Python runtime version field, retain the default value as 3.
9. From the Actions pane, click Python script > Execute function.
 - a) In the Python session field, retain Default.
 - b) In the Enter the name of function to be executed field, enter `get_node_count`.
 - c) In the Arguments to the function drop-down list, select `dResponseBody - String`.
 - d) In the Assign the output to a variable drop-down list, select `sTotalUserCount - String`.
 10. From the Actions pane, click Dictionary > Put.
 - a) In the Dictionary variable field, select `dRetrieveValue -Dictionary`.
 - b) In the Associate to this key field, enter `response`.
 - c) In the New value drop-down list, select `dResponseBody - String`.
 - d) In the Assign previous value to a variable drop-down list, select `prompt-assignment - String`.
 11. From the Actions pane, click String > To number.
 - a) In the Enter the string field, enter `sTotalUserCount`.
 - b) In the Assign the output to a variable drop-down list, select `nTotalUserCount - Number`.
 12. From the Actions pane, click Loop > Loop.
 - a) In the Loop Type > Iterator, select `For n times` from the drop-down list.
 - b) In the times field, enter `$nTotalUserCount$`.

- c) In the Assign the current value to a variable drop-down list, select `nCurrentUser - Number`.
13. From the Actions pane, click `Number`, select `Decrement` and place it inside the Loop action.
 - a) In the Enter number field, enter `$nCurrentUser$`.
 - b) In the Enter decrement value field, enter `1`.
 - c) In the Assign output to a variable drop-down list, select `nCurrentUser - Number`.
 14. From the Actions pane, click `Number`, select `To string` and place it inside of the Loop action, below `Number > Decrement`.
 - a) In the Enter a number field, enter `$nCurrentUser$`.
 - b) In the Enter number of digits after decimal field, enter `0`.
 - c) In the Assign output to a variable drop-down list, select `sCurrentUser - String`.
 15. From the Actiond pane, click `Dictionary > Put` and place it inside of the Loop action.
 - a) In the Dictionary variable field, select `dRetrieveValue -Dictionary`.
 - b) In the Associate to this key field, enter `count`.
 - c) In the New value drop-down list, select `sCurrentUser - String`.
 - d) In the Assign previous value to a variable drop-down list, select `prompt-assignment - String`.
 16. From the Actions pane, click `Python script > Execute function` and place it inside of the Loop action.
 - a) In the Python session field, retain `Default`.
 - b) In the Enter the name of function to be executed field, enter `get_full_name`.
 - c) In the Arguments to the function drop-down list, select `dRetrieveValue - Dictionary`.
 - d) In the Assign the output to a variable drop-down list, select `sFullName - String`.
 17. From the Actions pane, click `Python script > Execute function` and place it inside of the Loop action.
 - a) In the Python session field, retain `Default`.
 - b) In the Enter the name of function to be executed field, enter `get_location`.
 - c) In the Arguments to the function drop-down list, select `dRetrieveValue - Dictionary`.
 - d) In the Assign the output to a variable drop-down list, select `sLocation - String`.
 18. From the Actions pane, click `Message box` and place it inside of the Loop action.
 - a) In the Enter the message to display field, enter the following:

`Full Name: $sFullName$ Location: $sLocation$`
 - b) Select `Close message box after > Seconds`, enter `5`.
 19. From the Actions pane, click `Python script > Close` and place it outside of the Loop action.
 - a) In the Python session field, retain `Default`.
 20. Click `Save` to save your bot, and then click `Run`.
 The bot runs, displaying five full user names with locations for approximately 5 seconds each before completing its successful execution.

Use JavaScript to build a bot to take user input

Use the JavaScript actions Enterprise A2019 to execute JavaScript functions to build a bot. Use the actions to create a bot that takes user input and provides the appropriate output.

Ensure you have the following to build the bot:

- Basic understanding of JavaScript programming language.
 - Basic experience with creating Automation Anywhere bots.
1. Log in to the Enterprise Control Room.
 2. Go to Bots > My bots, and click the Create a bot icon.
 3. In the Name field, enter `Hello User`.
 4. Click Create & Edit.
 5. In the Actions pane, click Variables to create the following new variables:
 - a) Name `lInputList`, Type > List and Subtype > String.
 - b) Name `sInputName`, Type > String.
 - c) Name `sOutput`, Type > String.
 6. From the Actions pane, click Prompt > For value:
 - a) In the Prompt window capture field, enter `Enter your name here`.
 - b) In the Prompt message field, enter `Please enter your name here`.
 - c) In the Assign the output to a variable drop-down list, select `sInputName - String`.
 7. From the Actions pane, click List > Add item:
 - a) In the List variable drop-down list, select `lInputList - List`.
 - b) In the Item to be added drop-down list, select `sInputName - String`.
 - c) In the Add item field, select `To end of list`.
 8. Create a new JavaScript file.
 - a) Open a notepad, and copy and paste the following code:


```
function response(str){
  return "Hello "+ str
}
```
 - b) Save the file in your desktop as `Salutation.js`, and select Save as type: as All Files.
 9. From the Actions pane, click JavaScript > Open:
 - a) In the JavaScript session field, leave as Default.
 - b) In JavaScript > Import existing file, for the JavaScript file field, select Desktop file.
 - c) Click Browse and select the `Salutation.js` file from your desktop or where you saved the file.
 - d) In the Assign the output to a variable drop-down list, select `sOutput - String`.
 10. From the Actions pane, click JavaScript > Run JavaScript:
 - a) In the Enter name of the function to be executed field, enter `response`.

- b) In the Parameters drop-down list, select `InputList - List`.
11. From the Actions pane, click Message box:
 - a) In the Enter the message to display field, enter `$sOutput$`.
12. Click Save to save your bot, and then click Run.
13. When the bot prompts to enter a name, enter the name and click OK.
A message from the bot appears: `Hello <User>`.

Bot developer recommendations

Automation Anywhere provides a flexible platform for bot and package development. The information in this topic provide guidelines and recommendations on how to structure and develop robust and reusable bots and packages.

Bot Store submissions checklist

Use the checklist to ensure that your Enterprise A2019 Bot Store submission is correctly created, processed, and accepted. If you do not follow requirements listed in the checklist, your submission will be rejected and will not be published on the Bot Store page.

Use this checklist from the developer portal: [Enterprise A2019 bot submission checklist](#).

Building reusable bots

Review the guidelines to gain a better understanding of how to develop bots or subtasks for reusability, from designing and creating through reusing.

Define prerequisites, input, output, and variables

When you build bots for reusability, define the following:

- Document all necessary prerequisites on how to use your bot either on its own or as a subtask.
- When creating your bots, define values as input, output, or local. Input and output variables are used when your bot is designed to be used as a subtask, allowing it to receive and pass back values to or from another calling bot.
- Provide meaningful variable descriptions when defining input and output variables so that other developers know how to interact with your subtask.
- Adhere to an established standard for variable naming guidelines. Review the Automation Anywhere user-defined variables for variable naming guidelines. [User-defined variables](#) on page 869

Follow single-responsibility principle

Bots developed for reusability should follow the single - responsibility principle which states

that each subtask or component should have responsibility over a single part of the functionality of the overall bot and that responsibility should be entirely encapsulated by that subtask or component.

Other examples of single-responsibility:

- A subtask that processes a single transaction, but can be called multiple times for each transaction on a list.
- A subtask that collects screen display data on a single page of a website, but can be called multiple times as a bot goes through pagination.

Opening and closing applications

Any applications, files, or windows that a bot or subtask opens must be closed by the same bot or subtask.

- For example, when a bot opens Microsoft Excel to perform a spreadsheet operation, verify that the spreadsheet and Excel are closed when the bot finishes processing.
- Close applications when the bot execution is successful or unsuccessful.
- Use the Finally block of the Try/Catch/Finally operation to ensure applications are closed regardless of success of the task processing.
- In the case that applications do not respond during testing, consider using the command prompt to forcefully close (kill) the applications. For example, to forcefully close power point, the command-line operation would be:

```
Taskkill /IM powerpnt.exe /F
```

Error handling

After completing the task, verify that the bot successfully handles any failure or exceptions.

- Each task or subtask must handle its own errors.
- An unhandled exception in a subtask can cause issues in a parent task.
- Use Try/Catch/Finally blocks at the root level of every bot.
- Use Try/Catch blocks inside of a loop if you want to try an operation multiple times before reporting a failure.

Running bots on other computers

When designing a bot, enable it so it runs on computers other than the computer on which a bot was created.

- Use variables for local file paths, network shares, or window titles so that your bot can successfully run from other machines.

- Consider using global values for environment markers or network shares that multiple bots need access to.
- Use wildcard characters for window titles where appropriate to enable bots to run regardless of specific environment or version of the target application. For example, instead of using

```
Salesforce - Professional Edition
- Internet Explorer
```

use the following:

```
Salesforce - * - Internet Explorer
```

Using prompts, message boxes, and infinite loops

Prompts and message box actions stop the bots from running when waiting for a user input. Unless a user input is required, design the bots without using prompt statements.

- When using loops, ensure all loops have a definite end by clearly defining their number of iterations or specifying where break loop actions need to exist.
- If your bot is intended to run as an unattended bot, remove or disable any prompts or message box actions.
- If you are building bots for an attended automation scenario, message boxes and prompts are often reasonable or required for bots to run as expected. Use message boxes to display different variables, such as, responses, outputs, or values.

Storing sensitive data in the Credential Vault

The Enterprise Control Room includes the Credential Vault that can be used to store sensitive information, such as user names, passwords, API keys, and tokens.

- When building a bot, create a locker in the Enterprise Control Room using the Credential Vault to store credentials and retrieve them as required by referencing the credential and the attribute. This allows users to create bots that consume APIs or perform logins without the need for bot builders to directly hard-code the required credentials within a bot.
- Do not hard-code sensitive credentials into a bot, or a subtask, because hard-coded storage in a bot introduces a security risk.
- When Credential Vault values are required to be used in a bot, verify that all locker names and credentials are clearly defined in the bot documentation. If required, include details on

how to obtain credentials, for example, an API key or a token.

Testing independent tasks

When creating bots for reusability, design them in a way that they can be tested independently of other subtasks.

- Practice the test-driven development (TDD) approach: When adding a new bot, or a new feature in an application, write a test case for it.
- In a test case, define the specific function that validates that feature or functionality.
- For single-responsibility principle and reusability, create many smaller tasks that can be tested independently.

Using comments and steps

Comments enable developers to provide descriptions within their bots so that bot other bot developers can better understand what each section, block of code, or subtask is designed for. Include clear comments to allow developers to understand the purpose of the function of a given code block.

- When bots are submitted to the Bot Store, commenting demonstrates how to customize the bot.
- Using comments makes code maintenance easier because section descriptions help identify where changes might be required to enable developers to work towards quicker issue resolution
- Comments on bots that are a work in progress can be helpful when creating placeholders for future work. Consider using a TODO command as a reminder to add logic to the bot, but update the comments when the work is completed.
- Enterprise A2019 includes the Step action, which provides the capability to organize the code into logical groupings to improve readability and the flow.
- Create an outline of the major objectives of your bot by using empty, labeled step actions. When that is completed, go back to each step and complete the logic for the step.

Creating logging files

Identifying problems without logs can be difficult when bots are running unattended on any number of Bot Runners. Software developers, support teams, and bot owners rely on logs to understand where their automations have issues and how to diagnose problems. Bots must log errors to get error details.

- Use error handling and screen captures to better understand when a bot or subtask encounters an error.
- Use the A2019 Bot Store template that contains basic error handling, logging, and snapshot capabilities with the customizable root logging location for maintaining older log files.

[A2019 Bot Store bot template](#)

- If required, create additional logging files and include a full audit history of everything a bot or subtask has done. The additional log files can include audit, debug, and performance information about the bot, as well as the following:
 - Main bot start and end time.
 - Subtask start and end time.
 - The completion time of specific milestones defined within the bot.
 - Number of transactions received in an input file.
 - Number of successfully processed or failed transactions.



See also: [Best practices: Building reusable and secure A2019 bots and packages](#)

Related tasks

[Using Loop action](#) on page 692

Use the Loop action to repeatedly run a sequence of actions for a specific number of times or until a condition is met.

Related reference

[User-defined variables](#) on page 869

Users and some actions create user-defined variables to temporarily hold values. Use this kind of variable to input values into an action (window title, login credential, or file path) or to accept the output of an action (values read from a file or a Boolean return).

[Application package](#) on page 536

Use the Open Program/File action in the Application package to launch an application or a file. This action supports .exe, .bat, script files, or shortcut paths.

[Error handler package](#) on page 600

The Error handler package contains actions that enable you to easily handle exceptions that a bot encounters and transfers control to the other actions within that bot.

[Step package](#) on page 794

The Step package groups various actions together and runs them in a specific order. You can provide a relevant name for a step to identify the operation performed by the actions included in that step.

[Prompt package](#) on page 745

Use the Prompt package to accept an input value, a yes/no response, or to open a file or folder.

[Message box package](#) on page 694

Use the Message box action from the Message box package to insert a message box that shows a message when the task runs. For example, you can insert a Message Box action to follow a web form so that the action displays the message: **Web Form Filled and Complete**.

Building reusable packages

Review the guidelines to understand how to build packages for reusability.

Know your incoming data

When setting fields that your action package requires from the user, provide specifics in setting the attribute type to limit the kinds of data that your package receives.

- Limit the input to reduce the burden of checks that have to be done when the package is received.
- Javadoc includes 34 defined attribute types, so review those when you build your package to select the appropriate field types.
- Set your package so that it takes a stored value. For example, on behalf of the bot, your package is making API calls, verify that the AttributeType of the action input field for the API key or a token is set to credential. This way users are encouraged to use a value stored in the Credential Vault for sensitive input data that the package requires.

Use labels appropriately

In the CommandPkg annotation, use different labels, node_labels, and descriptions appropriately.

- Use these labels as short descriptions of your action and use only a few words to describe an action.
- Replicate the same naming style as it is presented in the default Action packages.
- Each action is a child element of a package, and the action label is displayed along with the package icon in the Actions pane. Use short names to describe each action.
- Document an expected input format for certain fields. Use the parameter description for the @Pkg annotation. This allows package developers to review the format, requirement, or data that must be used for a specific input field. For example:

```
@Pkg(label = "Start Date",
      description="Date Format as MM/DD/YYYY")
```

Unit test your components

During the package development, create unit tests to validate that each component and the action of the package is working as expected.

- Validate the behavior of the individual test unit, a single class, or a single action, to ensure that it is functioning as expected.
- Review and document any feature or functionality defects at early stages of the development process.

Handling errors

Include the error handling in the bot logic to ensure that all errors are handled gracefully. If an error is not handled, it could prevent a bot runner from executing other tasks.

- Create meaningful error messages that can help bot consumers with error resolutions.
- As a package developer, keep in mind these recommendations:
 - Use Try/Catch block to accommodate for an error.
 - Use a multi-catch block to find specific errors, and use the BotCommandException to return customized error messages. For example:

```
//create array of 3 items
int[] myIntArray = new int[]{1,
    0, 7};
try {
    //print 4th item in array

    System.out.println(myIntArray[3]);
    //Perform operation on
    first and second items in
    array
    int result =
    myIntArray[0] / myIntArray[1];
} catch
(ArrayIndexOutOfBoundsException
e) {
    //Throw custom message for
    IndexOutOfBounds
    throw new
    BotCommandException("The
    array does have the number of
    expected items.");
} catch (ArithmeticException e)
{
    //Throw custom message on
    Arithmetic Exception
    throw new
    BotCommandException("Math
    Operation Error with " +
    Integer.toString(myIntArray[0])
    + " and " +
    Integer.toString(myIntArray[1]));
}
```

Follow single-responsibility principle

A package is a collection of actions. Each action within a package must have a single responsibility

and that responsibility must be encapsulated by that action.

- Following the single-responsibility principle helps your package consumers to implement it easily, simplifies testing, and avoids unnecessary modifications.
- The actions that you offer allow package consumers to customize the way they use your package within their bots, and can help their bots be as efficient as possible.

Provide examples

When submitting packages to the Bot Store include a demo bot that demonstrates the use of the package.

- Use the Enterprise A2019 actions and allow package consumers to use these actions to expend their bot capabilities.
- Always provide sample bots with descriptions to help your package consumers with the knowledge they require to understand its proper use.



See also: [Best practices: Building reusable and secure A2019 bots and packages](#)

Related reference

[Building reusable bots](#) on page 1045

Review the guidelines to gain a better understanding of how to develop bots or subtasks for reusability, from designing and creating through reusing.

Troubleshooting and debugging

Troubleshooting and debugging information.

Troubleshoot bot run issue

Issue: I'm unable to deploy a bot because I get the following – Unexpected error setting up a new user session.

Cause:

Most often, this error is caused by invalid device credentials.

Solution:

Confirm the device is registered and connected.

1. Select Devices > My devices from the Automation Anywhere web interface.
2. Confirm that the Status column shows Connected for the relevant device.

Confirm that the device username and password are correct.

1. Select the profile icon on the Automation Anywhere web interface and select Edit profile.
2. Verify the device username.
Depending on how the device is configured within the network, you might need to prepend it with the domain name. For example, domainname\firstname.lastname.
3. Verify the device password.

Debugger features

The Automation Anywhere Debugger provides tools to help identify and fix issues during bot development.

To run a bot in Debugger mode, select the bot to run the debug function against and select Edit TaskBot. From the Edit TaskBot page, do the following:

1. Click the Debugger icon.
2. Click the Start icon.



Important: Use the List view to debug bots. The list view provides access to all of the Debugger features and visual indications of which action is running.

Debugger features:

- To debug your task one action at a time, insert a breakpoint next to each action. This makes the task pause at the breakpoint.
 - To insert a breakpoint, click the vertical ellipses and select Enable breakpoint.
 - To remove a breakpoint, click the vertical ellipses and select Disable breakpoint.



Tip: You can enable and disable breakpoints in the Debugger mode, or in the regular edit mode.

- To move one action at a time, click the Step over icon.
- To clear all breakpoints, click the Clear all breakpoints icon.
- To stop the current debugging session, click the Stop icon.
- To exit debugging, click the Exit debugger menu.



Note: You cannot edit actions in Debugger mode.

Bot agent log files

Various types of information about the Bot agent are captured in different log files. You can analyze these log files when the Bot agent or a bot encounters an error and identify the root cause for that error.

Overview

The Bot agent log files enable you to perform these actions:

- Determine whether a bot ran successfully
- Identify issues that resulted in a bot failure
- Determine if the device is properly connected with the Enterprise Control Room

Log file locations

The Bot agent log files are available at `C:\ProgramData\AutomationAnywhere\BotRunner\Logs` on your device. The following files are available at this location:

Bot_Launcher	Captures information about the execution of a bot such as the operations performed, events triggered, and errors encountered by the bot.
Node_Manager	Captures information about when a bot is run from the Enterprise Control Room and communication details between a Bot Runner and the Enterprise Control Room.

Log file configuration

The configuration files `botlauncher-logging` and `nodemanager-logging` are available at `C:\Program Files\Automation Anywhere\Bot Agent\config`. The information captured for the Bot agent in the log files depends on the configuration set in these files. You can update the configuration files to change the level of information captured in these files by setting the value in the `ROOT level` tag in the files, for example, `ROOT level="INFO"`.

You can configure the following modes in the configuration files:

Mode	Level	Description
ALL	TRACE, DEBUG, INFO, WARN, ERROR, and FATAL	This is the most verbose logging level and logs all the modes.
TRACE	TRACE, DEBUG, INFO, WARN, ERROR, and FATAL	This mode captures information for all the modes.
DEBUG	DEBUG, INFO, WARN, ERROR, and FATAL	This mode captures information that you can use to debug a bot. Information in this file is typically used by a Bot Creator.

Mode	Level	Description
INFO	INFO, WARN, ERROR, and FATAL	By default, this mode is set in the log files. This mode captures information used for monitoring the normal operations of a bot and auditing. You can use the information collected in this mode to determine whether a business process was completed properly or not.
WARN	WARN, ERROR, and FATAL	This mode captures information about all the warnings that appear when a bot is executed.
ERROR	ERROR and FATAL	This mode captures information about all the errors encountered when a bot is executed.
FATAL	FATAL	This mode captures information about the exceptions encountered when a bot is executed.
OFF	None	This mode does not capture any information.

Manage

This collection of topics will guide you in configuring the devices and users that access Automation Anywhere.

Learn more about these topics:

Related tasks

[Schedule a bot](#) on page 1058

Schedule a bot to run at a specific time.

[Set up locker and assign credentials](#) on page 1100

Create a role, credentials, and locker to share related sensitive values with a group of users, so they can use those values to build or run bots.

[Create and assign roles](#) on page 1110

Administrators configure roles with permissions to access features and perform operations such as create, edit, or delete a bot in the Enterprise Control Room.

[Create a user](#) on page 1106

Create a user and assign their specific license based role.

[Set user device credentials](#) on page 415

To enable a device for running bots, set the local device credentials.

[Edit profile](#) on page 389

Manage user profiles.

[Installing additional licenses](#) on page 1145

Upload new licenses to the Automation Anywhere Enterprise Control Room to be distributed to users as required.

Activity

Monitor, pause, stop, and resume ongoing automation activities and view all the Bot Runner (attended or unattended) trigger deployments in queue.

In Progress Activity

Enables user to monitor a range of process activities. Apply search parameters to find a specific bot. Search parameters include:

Status

Choose the status to search, options include:

- Active
- Paused
- Unknown
- Paused for input
- Pending execution
- Queued

Current action

Type the action.

Current bot

Type the bot name.

bot	Type the bot name.
Activity type	Select the type, options include: • Run bot • Import queue files • Run bot with queue
Queue	Type search criteria.
Device	Type search criteria.

Action buttons

Use mouse to rollover action icons (vertical ellipsis) to identify specific functions. The following actions are enabled:

Refresh	Refresh the contents to view the updated status.
Pause checked items	Pause the process.
Resume checked items	Resume running the process.
Stop checked items	Stop the process.
Move checked items to history	Moves the selected activity to history.
Export checked items to CSV	Export the data to a CSV file based on: • Filters • Selection
Customize columns	Show or hide specific columns.

Schedule

Schedule bots to run on unattended Bot Runners from the Activity > Scheduled tab in the Enterprise Control Room.

Overview

Edit, view, activate, deactivate, delete a schedule, export selected activity details to a CSV file, and search by activity name.

Perform the following actions on a column:

- Click a column to sort it in ascending or descending order.
- Use a drag-and-drop operation to move the column left or right.
- Move the mouse cursor to the end of the column and drag to re-size.

Schedule Actions

Perform the following tasks on an individual Schedule by moving your mouse over the Actions icon.

Schedule a bot

Schedule a bot to run at a specific time.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Manage the bot schedule.



Note: Automation will fail in the following cases:

- If any of the bot dependencies are missing.
- If you do not have folder privileges on the dependencies.
- If you do not have the Run+Schedule permissions.

1. Navigate to Activity > Scheduled.
2. Click Run bot.
3. Click Schedule bot.
4. Enter the Name.
5. Optional: Enter a description.
6. Add the scheduling details for the bot.



Note: The value of the Start date is always later than or equal to the current date. If the start date is the current date, the scheduled time cannot be less than the current time.

Option	Definition	
Run once	To run the bot at a specified time, enter the:	
	Start date	Default value is the current day.
	Start time	Default value is roundup to the next half-hour.
	Time zone	Default Time zone is PDT (UTC-7:00) Los Angeles, America.
Run repeatedly	To schedule a bot to run at specific time on a given day, enter the:	
	Start date	Default value is the current day.
	End date	The default value field is blank.
	Start time	Default value is roundup to the next half-hour.
	Time zone	Default Time zone is PDT (UTC-7:00) Los Angeles, America.

7. Select the bot to schedule.
Available bots are displayed along with any Input values and dependencies.
8. Select the Bot Runner user from the Available bot runners list.
To enable a device, it must be connected to the Enterprise Control Room.



Note: If a device does not appear in the list, ensure that an active Bot Runner session is running on the device.

9. Click the right arrow (→) to add your selection.
10. Select Device pools.
Select the pool from the list of available device pools.
11. Click Schedule bot.

The Schedule bot option remains disabled until all the required items, such as bots, schedule details, and devices, are selected.

Related concepts

[Bot permissions for a role](#) on page 1119

Assign bot permissions when creating a role with the View my bots feature permission.

Related tasks

[Edit a scheduled activity](#) on page 1059

Make changes to a schedule so that the automation is not skipped.

[Delete a scheduled activity](#) on page 1060

Delete a scheduled activity.

Edit a scheduled activity

Make changes to a schedule so that the automation is not skipped.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Edit the scheduled activity in order to:

- Change the schedule type, date, or time.
- Add or remove Bot Runners from the schedule.
- Change the retry settings.



Note: The system redeploys the bots and dependencies only if there are updates to the bots or its dependent files.

1. Hover over the Actions icon for the scheduled bot in the Activity table.
2. Click Edit.
3. Make changes to the schedule details, bots, and devices, as required.

Option	Definition	
Run once	To run the bot at a specified time, enter the:	
	Start date	Default value is the current day.
	Start time	Default value is roundup to the next half-hour.
	Time zone	Default Time zone is PDT (UTC-7:00) Los Angeles, America.
Run repeatedly	To schedule a bot to run at specific time on a given day, enter the:	
	Start date	Default value is the current day.
	End date	The default value field is blank.
	Start time	Default value is roundup to the next half-hour.
	Time zone	Default Time zone is PDT (UTC-7:00) Los Angeles, America.

4. Click Schedule bot.

The Schedule bot option remains disabled until all the required items, such as bots, schedule details, and devices, are selected.

Related tasks

[Schedule a bot](#) on page 1058

Schedule a bot to run at a specific time.

[Delete a scheduled activity](#) on page 1060

Delete a scheduled activity.

Delete a scheduled activity

Delete a scheduled activity.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

To delete a scheduled activity:

1. Hover over the Actions icon for the scheduled bot in the Activity table.
2. Click Delete.
Confirm or cancel as required.
3. Click Yes, delete.

Related tasks

[Schedule a bot](#) on page 1058

Schedule a bot to run at a specific time.

[Edit a scheduled activity](#) on page 1059

Make changes to a schedule so that the automation is not skipped.

Using event triggers

All the bots that have a preset or predefined event as a trigger are listed under the Event triggers tab.

Available user roles associated with event triggers

The following table lists the Enterprise Control Room user roles for viewing or managing event triggers:

Role	Description
View event triggers	Enables a view-only access and the user cannot delete any event triggers.
Manage event triggers	- Can delete an existing event trigger. - Can associate an event trigger with a Bot Runner (attended or unattended) user or a role that is associated with one or more Bot Runner (attended or unattended) users.

Supported actions

In Enterprise A2019, click ACTIVITY > Event triggers to view the table that lists all the available bots with event triggers. The following actions are available for this table.

- Enter a keyword from the BOT PATH in the Search field to find an event trigger.
For example, if the bot path of an event trigger is Bots\file--created--event--Salesinfo, enter Sales in the Search field to find this event trigger.
- Use the Run with event triggers option to add event triggers.
[Adding event triggers](#) on page 1061
- View the trigger status, bot path, user name, role, and modification details.

Related concepts

[Adding a trigger to run a bot](#) on page 945

Add triggers that can automatically run the selected bot whenever a specific event occurs. For example, clicking a specific button or using a combination of keystrokes.

Adding event triggers

Enterprise Control Room users with Manage event triggers role can add event triggers in Enterprise A2019.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

- Navigate to Bots > My Bots.
- Click Run bot.

3. Click Run with event triggers.
4. Select the bot.
5. Click the right arrow (→) to add your selection.
6. Click Next.
7. Select one of the following to link the bot:

Option	
Roles	Select the custom role you have created.
Users	Select the Bot Runner (attended or unattended) user who is associated with this custom role.

8. Click the right arrow (→) to add your selection.
9. Click Next.
10. Click Run with event triggers.

The selected bot is added to the Event triggers page under Activity.

Linking event triggers to a Bot Runner

An Enterprise Control Room administrator can add event triggers by associating users or roles with a bot. This enables users to trigger the bot when they perform a specified event.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

When a user with a Bot Creator license creates a bot and checks it in a repository, the bot is available in the Public workspace. The Enterprise Control Room administrator can then add an event trigger.



Recommendation: Ensure to associate triggers only with users who have an attended Bot Runner license. If you include users with unattended Bot Runner licenses, they must provide the login credentials of the default device.

1. Navigate to Bots > My Bots.
2. Click Run bot.
3. Click Run with event triggers.
4. Select the bot.
5. Click the right arrow (→) to add your selection.
6. Click Next.
7. Select one of the following to link the bot:

Option	
Roles	Select the custom role you have created.
Users	Select the Bot Runner (attended or unattended) user who is associated with this custom role.

8. Click Add event trigger.

When the Bot Runner user logs in to Enterprise Control Room and performs the trigger event, the bot is deployed.

A Bot Runner (attended or unattended) user must log in to the Enterprise Control Room to start the event trigger, and log out after that event trigger is activated. The event trigger will continue to work until one of the following changes occur:

- Associated bot is deleted from the public workspace.
- The linked Bot Runner user account is deleted.
- The default device is logged off or shut down.

Historical activity

You can search, edit, and deploy previously created bots.

Search parameters

Apply search parameters to find a specific bot. These parameters include:

Status

Choose an activity status:

- Completed
- Failed
- Stopped
- Timed out
- Unknown
- Deploy failed
- Pending execution

Item name

Enter the name of the item listed.

Device name

Enter the device name.

Bot name

Enter the name of the bot.

User

Enter the user name.

Actions buttons

You can perform the following actions:

Export checked items to CSV

Export the data to a CSV file based on:

- Filters
- Selection

Refresh

Refresh the contents to view the updated status.

Customize columns

Show or hide specific columns.

Completed historical activity

View a list of all completed activities and corresponding information.

Completed activities

All activities, successfully completed or not, are listed in the historical activity page. From this page, run an activity again and perform other tasks such as export the data in the table in CSV format, customize columns, or refresh the list in the table. Apply search parameters in the search bar.



Note: Specify search parameters for the same column using OR operator. Specify search parameters for different columns, the system searches using AND operator.

Perform the following actions on a column:

- Click a column to sort it in ascending or descending order.
- Use a drag-and-drop operation to move the column left or right.
- Move the mouse cursor to the end of the column and drag to re-size.

Information displayed

The Activity table displays information such as the following:

Status	The status of the activity, including unknown, completed, failed, stopped, or time out.
Item name	The name of the item.
Device name	The name of the Bot Runner machine.
Bot name	The name of the bot.
User	The name of the user in whose account that particular activity or automation was running on the device.
Started on	The date and time when the activity was started.
Ended on	The date and time when the activity was completed.
Last Modified	The date and time when the activity was changed.
Modified By	The name of the user who recently changed the activity.

Actions

Click any individual item to perform the following actions:

View	View details of the completed activity.
Run bot	Run the selected bot. Click Run to open the Run bot now page with all the values of the bot populated.



Tip: Move your mouse over and click the Run icon to run the activity again.

Actions must be done only at a table level, and not on individual items.

Audit Log

View logs and details to record user activities.

Audit Log displays a read-only table of records of actions performed by users. These log records are searchable and exportable. Audit logs include both Successful and Unsuccessful actions attempted.

Actions

The following Audit log actions are enabled:



Note: Use your cursor to roll over the action button icons to identify specific functions.

Time filter

Users select from preset time filters or configure a custom time filter for log entries to view. The default time filter setting is Last 24 hours.

Search

Search the records. Select additional search filter criteria from the drop-down menu.



Tip: To search the exact phrase, enclose the search phrase within double quotes (for example, "Juan-Finance-564").

Export checked items to CSV

Export the data to a CSV file based on filters and or selections.

Refresh

Refresh and view the updated status.

Customize columns

Show or hide specific columns.

View

To view details of a table entry, mouse over the entry to expand and click Audit details.

Audit log table

View the following audit details in the table. Click a column to sort it in ascending and descending order.

Table item	Description
Status	Shows action status.
Time	Shows the date and time of the action performed.
Event Type	Shows the type of action performed.
Item Name	Shows the entity on which action was performed.
Event Started By	Shows the user that performed the action.
Source Device	Shows the device or machine name or IP address that was used to perform the action.
Source	Shows the component: Enterprise Control Room, Enterprise client or API, from where the action originated or was performed.
Request ID	Shows the unique identity number assigned to a specific set of user actions.

Understanding audit logs

The entry shows the status of each stage of the bot life cycle.

Audit log entry	Success	Failure
Create automation	Bot was sent to the control room and was successfully compiled.	Check if the Enterprise Control Room is up and running.
Bot Sent To Device	Enterprise Control Room deployed the bot successfully on the specified device.	Possible reasons for failure entry include: • Check if you have configured the Node manager on the corresponding device correctly. • Check for the app Automation Anywhere Bot Manager in Add Remove Programs or in Control Panel > Uninstall a program. Try to reinstall by uninstalling and downloading the app again. • Try to reinstall by uninstalling and downloading the app again from Device Manager. • Ensure the device auto log in details are set correctly.
Run bot Deployed	The bot has started on the specified device.	Possible reasons for failure entry include: • Check if you have configured the Node manager on the corresponding device correctly. • Check for app Automation Anywhere Bot Manager in Add Remove Programs or in Control Panel > Uninstall a program. • Try to reinstall by uninstalling and downloading the app again from Device Manager. • Ensure device auto log in details are set correctly.

Audit log entry	Success	Failure
Run bot finished	Bot execution completed successfully.	Possible reasons for failure entry include: • Check for the bot execution progression in Activity In progress. • Check the code at the line where activity log has been paused for errors. • If it has paused at a message box, minimize all windows and check if the message box is in the background.
Bot Runner Session Continued	Enterprise Control Room deploys the TaskBots in a sequence for the same RDP session.	Possible reasons for failure entry include:
Bot Runner Session Released	When a task successfully completes the execution.	Possible reasons for failure entry include:
Download file	Downloading to the Enterprise Control Room.	Possible reasons for failure entry include:
Upload file	Uploading a file to the Enterprise Control Room.	Possible reasons for failure entry include:
Bot Runner Session	Enterprise Control Room gets the RDP session of Bot Runner machine.	Possible reasons for failure entry include:

Devices

The device is a machine through which a user connects to the Enterprise Control Room to create or run bots. Manage devices that are registered to the Enterprise Control Room through the My devices page located in the DEVICES tab.

Tasks performed from the Devices tab

As an Enterprise Control Room user with Bot Runner, Bot Creator, and Device pools privileges, use the DEVICES tab to do the following:

- View a list of devices registered and connected to the current instance of the Enterprise Control Room.
- Create and view a list of device pools available from the current instance of the Enterprise Control Room.
- Run bots immediately on selected Bot Runners.
- Schedule bots to run on selected Bot Runners.
- Run bots on selected device pools.

If the device is already registered by another user other than the Bot Creator and the Bot Creator does not have the `Register device` permission or the associated device assigned to it, when you run a bot from the bot editor window, the deployment fails with an `insufficient permission` error message.



Notes:

- Only an admin user has access to view all the devices in the Enterprise Control Room. A non-admin user does not have access to view Bot Creators.
- Only one Bot Creator can be logged in to a device to run bots at any one time. For a new user as a Bot Creator on the same device, the first Bot Creator has to be removed.

My devices

The My devices page displays all configured devices and the current state for each device listed. Devices are identified by IP and hostname. A device can be in one of the following states:

Connected	Device is logged in to the Enterprise Control Room.
Disconnected	Device is not logged in to the Enterprise Control Room.
Offline	Device has been unregistered or disabled by the Enterprise Control Room administrator.

The following actions are enabled:

Add local host as a device	The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.
Run bot now with checked items	Runs the bot on selected device.
Export checked items to CSV	Export the data to a CSV file based on: • Filters • Selection
Refresh	Refresh the contents to view the updated status.
Customize columns	Show or hide specific columns.
View and edit device	With the View and manage ALL device(s) permission, you can view and edit the following device settings on the device landing page: • Name • Status • Bot agent version • Device pool name • Nickname (optional) • Description • Device type (single user or multiple users)

In case of a multi-user device, you can edit the Concurrent sessions supported field.

- Add or edit device permissions
- Screen resolution

You can set the screen resolution by either selecting a value from the predefined resolution drop-down list or by selecting custom and entering the values.

- You can edit only the nickname, description, device type, and screen resolution fields.
- Ensure that you have selected the Allow devices to override resolution settings option in the Enterprise Control Room settings for the device level resolution to take effect.

- Lifespan

You can select the device lifespan as Persistent or Temporary. Temporary devices are created to support non-persistent virtual desktop infrastructure (VDI) and are automatically deleted after a specified time when the device is disconnected from the Enterprise Control Room. You can specify the time to automatically delete temporary devices in the Enterprise Control Room devices settings.

Persistent devices are created to support persistent virtual desktop infrastructure (VDI) and are not deleted after the device is disconnected from the Enterprise Control Room.

- Auto-login settings

You can customize the auto-login settings for each device. Choose between the settings configured in the Enterprise Control Room or at the selected device level to either create new user sessions or use existing user sessions after a bot finishes running.

For information about auto-login user session options, see [Configure auto-login settings](#) on page 1134.

My device pools

Device pools provide a logical grouping of similar Bot Runners to run bots with the work items from a queue. For example, group devices of a particular department or unit and create a device pool for it.

Related tasks

[Install Bot agent and register device](#) on page 400

The Bot agent is a lightweight application that enables you to run bots on your device by connecting the device to the Enterprise Control Room. To run bots on a local machine, install the Bot agent and add the local device to the list of enabled host devices.

[Set user device credentials](#) on page 415

To enable a device for running bots, set the local device credentials.

About multi-user devices

A multi-user device is any Windows terminal server device (Windows 2019, Windows 2016, Windows 2012, Windows 10 Enterprise on Azure) which enables multiple users to concurrently log in to a single device.

The multi-user device server enables multiple users to access the same operating system and share the hardware, performing the tasks for each user concurrently. In multi-user devices, bots are deployed using RDP.

Benefits of a multi-user device

A multi-user device ensure that each machine in an organization is fully used, reducing the hardware and software cost by enabling different users to access the same device. Bot Creator users and Bot Runner (attended or unattended) users can be configured on a multi-user device. The multi-user device also provides security and authentication for every user. Each user is assigned unique login credentials for the device and can access only the assigned applications and device settings.



Note: In a multi-user device, if two user sessions with the same device credentials try to deploy a bot, the deployment will fail for one of the user sessions. An appropriate failure message is recorded in the audit log.

Multi-user device in a device pool

A multi-user device can be part of a device pool and the device can be set as the default device for Bot Creator users and Bot Runner (attended and unattended) users.

Set as default device

As a licensed user, when you log in to a non-default device, you can set that device as your default device. You must have the View and manage ALL device(s) permission if you want to set another device that is not registered by you as your default device: To set it as the default device, follow these steps:

1. Click the device icon on the top-right of your screen.
2. Select the Make default device option from the menu.

If you do not have the necessary permission, a message prompt appears, stating that you will lose access to your current default device.

Configure RDP-based deployment for multi-user devices

RDP-based deployment is used for multi-user devices. When a bot is deployed for an unattended Bot Runner from the Enterprise Control Room, the Enterprise Control Room handles the unattended Bot Runner session through RDP and executes the bot.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Ensure the following requirements are completed:

- Active Directory Domain Services are set up.
- Remote Desktop Services (RDS) are set up.
- Active Directory users are created.
- Users are provided access to RDS.

When registering your device, you can register it as a multi-user device.

1. Navigate to Devices > My devices.
2. Hover over the Actions icon for the device.
3. Click Edit.
4. Change the Device type to Multiple users.
5. Enter a value for the Concurrent sessions supported field.

The maximum number of allowed concurrent sessions depends on your device license type and the hardware configuration. For example, consider that concurrent sessions is set to 10 and each bot requires 4 GB RAM for execution. If your system RAM is lower than this value, the bot execution might fail.

Also, if the maximum number of sessions allowed in your device is 10 and the multi-user device is set as the default device for 3 Bot Creator users and 2 attended Bot Runner users, then the value for the concurrent sessions supported will be 5. Therefore, at a time, only 5 bots can be deployed concurrently by the unattended Bot Runner users. So ensure that your hardware and device license type support the number of sessions you set.

6. Set the RDP screen resolution.

This ensures your automation runs seamlessly during RDP-based deployment, even if the resolution of the screen varies between the Bot Runner and Enterprise Control Room.

You can set it in the following ways:

- At the Enterprise Control Room level: [Change screen resolution for Bot Runner session](#) on page 1133.
- At the device level: [Devices](#) on page 1067.

7. Edit the RDP settings for multiple user devices field.
8. Enter the Port.
9. Enter the RDP session timeout value.



Note: The default port is 3389 and session timeout value is 60.

10. Click Save changes.

1. Create users in the Enterprise Control Room.

These users can be unattended Bot Runners, Attended Bot Runners, or Bot Creators. You can select the multi-user option when you register the device for the first time..

[Create a user](#) on page 1106

2. Associate the correct device and session login credentials based on the Active Directory users that you create before configuring the multi-user device settings.

You can register an Active Directory user once as an admin user and the sessions are created when you deploy bots. You do not have to create an RDP session on the Bot Runners server and register the device under an Active Directory user name and user credentials.

3. Deploy the bots on parallel sessions.



Note: If the multi-user device per sessions count provided is less than the actual bot deployment, then the additional bot deployments are queued until the current deployments are in progress.

Convert an existing device to a multi-user device

If you have a server OS, multi-user OS, or hosted VMs such as AWS, Microsoft Azure, or VMware as the Bot Runner machine, you can convert your existing device to a multi-user device.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Converting a device enables you to share the same device between Bot Runner and Bot Creator users because they can coexist in different sessions simultaneously. Also, multiple parallel executions of a bot can be performed on the same machine.

If you encounter Auto Login issues because multiple users are sharing the device or because it is a remote device, convert your device to a multi-user device.

If you have a single-user device and want to use RDP-based deployment, then set the device type as Multiple users and Concurrent sessions supported to 1.

1. Navigate to Devices > My devices.
2. Hover over the Actions icon for the device.
3. Click Edit.
4. Change the Device type to Multiple users.
5. Enter a value for the Concurrent sessions supported field.

The maximum number of allowed concurrent sessions depends on your device license type and the hardware configuration. For example, consider that concurrent sessions is set to 10 and each bot requires 4 GB RAM for execution. If your system RAM is lower than this value, the bot execution might fail.

Also, if the maximum number of sessions allowed in your device is 10 and the multi-user device is set as the default device for 3 Bot Creator users and 2 attended Bot Runner users, then the value for the concurrent sessions supported will be 5. Therefore, at a time, only 5 bots can be deployed concurrently by the unattended Bot Runner users. So ensure that your hardware and device license type support the number of sessions you set.

6. Click Save changes.

About device pools

Device pools are a logical grouping of devices or similar Bot Runner machines on which you can run your workload management automations or scheduled automations. For example, you can group devices of a specific department or unit and create a device pool for it.

Overview

Device pools enable you to restrict bot deployments to a specific set of devices that are available from your Enterprise Control Room instance and to take advantage of any available device in the pool. Any device in the device pool can run the bot.

A device pool is a dedicated set of Bot Runners to process Work Items in queues. Multiple Bot Runners enable you to scale high-volume tasks as the workload is shared across the device pool, thereby providing load balancing. Device pools can contain different types of devices, single user or multi-user devices.

You can share the device pool between multiple automations such as WLM, Run bot, and Schedule bot, thus improving the device utilization.

How a device pool works

When you deploy a bot to a device pool, the bot is automatically sent to the first available device in that device pool. As the other bots are deployed, they can run concurrently on the other devices in the device pool. By dynamically allocating devices when bots are deployed, bot deployments are executed quickly and efficiently.

You can assign priorities to devices in a device pool so that a specific device is used before other devices in the device pool. The priority assigned to a device in one device pool is not related to that device's priority in another device pool.

High availability (HA) in device pools

Device pools provide built-in [High Availability](#) for the Bot Runner machines. You are not tied to a single Bot Runner machine, so if your Bot Runner machine is unavailable for any reason, your automation is not affected. The scheduled automation will automatically run on the next available Bot Runner machine, thereby providing high availability.

Managing device pools

As a device pool administrator, you can create, edit, and view all device pools that can be used for scheduling automations and workload management.

As a device pool owner or consumer, you can view only those device pools of which you are the owner or consumer. Only users with the AAE_Queue Admin role can perform device management tasks.



Note: You have to create device pools to view those in the list.

To easily access your device pool, you can search by a device pool name.

- Click a column to sort it in ascending and descending order. You can sort up to three columns by holding the Shift key when you click two more columns. This enables you to sort two additional

columns. The sorting is done on the entire table and not just the data that is currently visible to you. The last sorting is stored in memory applied by a user per session.

- Use a drag-and-drop operation to move the column left or right.
- Move your mouse cursor at the end of the column and drag to resize.

Create device pools

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

- You can add only those Unattended Bot Runners that are not part of any other pool and are not associated with any role.



Restriction: Unattended Bot Runners that are a part of other device pools are disabled for selection.

- If the device associated with the Unattended Bot Runner is added to the device pool, you can only use the Run bot with queue option to run bots on that device. You cannot create a device pool comprising of Attended Bot Runners.
- You can add Enterprise Control Room user roles as consumers. Only users with these roles can use the pool for any automation.
- You can select only those devices with the Bot Runner installed at the system level.

By default, the creator of the pool is the device pool owner.



Restriction: You cannot remove the device pool creator.

To create a device pool, do the following:

1. Navigate to Devices > My device pools.
2. Click Create device pool.
3. Enter the Name.
4. Optional: Enter a description.
5. Select the Unattended Bot Runners.
6. Click the right arrow (→) to add your selection.
7. Click Next.
8. Select the Device Pool Owners.
9. Select user(s) from the Available users list.



Tip: Search the list of users based on their Username, First name, or Last name.

10. Click the right arrow (→) to add your selection.
11. Click Next.
12. Optional: Select the Device Pool Consumers.
Complete this step to enable device pool consumers to view the device pool when they run the automation for the bot with a queue by following the next set of steps.
13. Optional: Select a Role from the list of Available roles.
14. Click the right arrow (→) to add your selection.
15. Click Create device pool.

The device pools for which you have consumer privileges are listed in the My Device Pools page.

[View device pool details](#) on page 1075

Related concepts

[Run bot with queue](#) on page 1085

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

View device pool details

As a Enterprise Control Room user with device pool management privileges or as a device pool owner, you can view device pool details to ensure the information provided is correct and if required customize as per your automation requirement.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Use the Device pool details page to view automations that are scheduled to run with or without workload. The following information is displayed as part of device pool data:

Automations

Shows the automations that are using the device pool and the order that is chosen to run those. This is shown as the default view. To find an automation quickly, use the search option using Status, Automation name, Queue, or Activity type.

You can perform the following actions on a table column:

- Click a column to sort it in ascending and descending order. You can sort up to three columns by holding the Shift key when you click two more columns. This enables you to sort two additional columns. The sorting is done on the entire table and not just the data that is currently visible to you. The last sorting is stored in memory applied by a user per session.
- Use a drag-and-drop operation to move the column left or right.
- Move your mouse cursor at the end of the column and drag to resize.

Devices

Shows list of unattended Bot Runner devices that are part of the device pool.

Owners

Shows list of device pool owners that are granted permission to view, edit, and delete the device pool.

[Create device pools](#) on page 1074

Consumers

Shows the list of device pool consumers who are granted permission to view the device pool as an option to running automations.

[Create device pools](#) on page 1074

General Details

Shows the last modified date and time, name of the user who modified device pool details, and the

Object Type which is the component on which modification was done.

The Scheduled Automations tab is selected by default. Automations that are created using Run bot now or Schedule bot (upcoming schedules) on that device pool are listed.

The second tab, Run with Queue Automations lists the automations that are scheduled to run for Workload using the option Run bot with queue.

To view device pool details:

1. Navigate to Devices > My device pools.
2. Hover over the Actions icon for the device pool and select View.
Select each tab to view the related details.

[Edit device pools](#) on page 1076, or [Run bot with queue](#) on page 1085.

Related tasks

[Create device pools](#) on page 1074

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

[Delete device pools](#) on page 1078

Delete a device pool comprising of unattended Bot Runners after your entity's automation goals are achieved and the device pools are no longer required.

Edit device pools

As an Enterprise Control Room user with device pool management privileges or as a device pool owner, you can edit device pool details to customize your automation requirements.

When you open the device pool in edit mode, you have to first define the priority or the order in which the automations will run in the Automations tab. The priority options are visible only when you edit a device pool and are not available when you create a device pool. You can also update the Bot Runner, Owner, and Consumer details.

1. Go to Devices > My Device Pools.
2. Locate the device pool you want to edit, mouse over the actions menu (vertical ellipsis), and click Edit.

You can also edit device pool details when in view mode.

[View device pool](#)

The Device pool details page appears with the Scheduled Automations tab selected by default.

The first tab, Scheduled Automations lists the automations that are created using Run bot now or Schedule bot (upcoming schedules) on that device pool.

[Run a bot](#) on page 856

[Schedule a bot](#) on page 1058

The second tab, Run with Queue Automations lists the automations that are scheduled to run for Workload using the option Run bot with queue.

3. Set the Queue Execution mode to edit workload automations.

Select the Run with queue automations tab, then select either Round robin or Priority as shown in table to define the order in which your automations run in the queues:

- Round robin: Run your automations at equal time intervals in the Time slice field.
Set a Time slice in seconds, minutes, or hours. Calculate or estimate the time for each automation and then provide this number.

- The default time slice is 5 minutes.
- The time slice cannot be set to zero.

Automations are executed for only 5 minutes first, then the system checks for other automations in queue for execution. If there are other automations in the queue, that automation is paused and the next automation is executed. This method continues until all automations in the queue are executed.

- Priority as shown in table: Run your automations based on a priority defined in the priority table. This method enables you to run automations in the order of priority.

Set the individual priorities for each of the queues. Priority 1 is the highest priority and that queue is processed first and completely by the device pool. Then the device pool moves onto the processing queue with Priority 2. When the queue with Priority 2 is processed completely, the device pool proceeds to processing queue with Priority 3, and so on.

Automations are processed until all automations are consumed from the specified automation queue.

This option appears only on the Run with queue automations tab. It is not available when you use Schedule Automations.

The following details are listed the priority table:

Table item	Description
Priority	Shows the priority number allotted to that queue. • You can edit the Priority column. You can set or reset the priority of implementing the automations. Ensure that you provide a unique priority value to two different work items because same values are not be allowed. • You can also view the priority list in ascending or descending order by clicking the ordering arrows in the Priority header.
Status	Shows the automation status: Active or Inactive.
Automation Name	Shows the automation that is selected to run on the device pool.
Started On	Shows the run date and time of the automation.
bot	Shows the bot name that will run using this device pool.
Queue	Shows the queue name that will be used to run the automation using this device pool.
Activity Type	Shows the activity type used to run the automation using this device pool - Run bot with queue.

You can perform the following actions on a table column:

- Click a column to sort it in ascending and descending order. You can sort up to three columns by holding the Shift key when you click two more columns. This enables you to sort two additional columns. The sorting is done on the entire table and not just the data that is currently visible to you. The last sorting is stored in memory applied by a user per session.
- Use a drag-and-drop operation to move the column left or right.
- Move your mouse cursor at the end of the column and drag to resize.

4. Update the list of unattended Bot Runner devices that will be included in the device pool.
5. Update the list of device pool owners who are granted permission to view, edit, and delete the device pool.
6. Update the list of device pool consumers who are granted permission to view the device pool.
7. Click Save changes.

Related tasks

[Create device pools](#) on page 1074

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

[Delete device pools](#) on page 1078

Delete a device pool comprising of unattended Bot Runners after your entity's automation goals are achieved and the device pools are no longer required.

[View device pool details](#) on page 1075

As a Enterprise Control Room user with device pool management privileges or as a device pool owner, you can view device pool details to ensure the information provided is correct and if required customize as per your automation requirement.

Delete device pools

Delete a device pool comprising of unattended Bot Runners after your entity's automation goals are achieved and the device pools are no longer required.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

You can choose to delete your device pools in either of two ways:

- Delete one device pool
- Delete multiple or all device pools

If the device pool is being used for workload automation, you will not be allowed to delete it.

1. Navigate to Devices > My device pools.
2. Select the device pool(s) to delete.
Select the device pools to delete or select all device pools by selecting the Select All check box in the header.
3. Hover over the Actions icon for the device pool.
4. Click Delete.
Confirm or cancel as required.

Related tasks

[View device pool details](#) on page 1075

As a Enterprise Control Room user with device pool management privileges or as a device pool owner, you can view device pool details to ensure the information provided is correct and if required customize as per your automation requirement.

[Create device pools](#) on page 1074

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

Workload management

The workload management module enables users to upload Microsoft Excel and CSV files to the Enterprise Control Room so that it feeds the records from the files into the bot deployments.

These records contain highly sensitive information, for example, PII, PCI, PHI, and more. This data is carefully protected by the data encryption key and is at rest in the file share and database.

Divide your automations into small, logical Work Items from the Workload page. Process the Work Items simultaneously to ensure that your automation goals are achieved with optimum resource utilization.

Prerequisites

To manage your workload automation, ensure that you are allocated a combination of any or all of the following roles and permissions:

Feature type	Privileges
User roles	- AAE_Admin - AAE_Queue_Admin - AAE_Pool_Admin
Activity permissions	- View my in progress activity - View my scheduled bots - Schedule my bots to run
Device permissions	- View and manage my Bot Creator, Bot Runner, and device pools - Create device pools - Administer all device pools
Bots permissions	- View my bots - Run my bots
Workload permissions	- View and manage my queues - Create queues - Administer all queues

Watch the following video on how to use the Workload feature in the Enterprise Control Room:

Related tasks

[Attach work item template to TaskBot](#) on page 861

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

[Use Work Item variables](#) on page 877

You can use the Work Item variables to pass the Work Item attributes or values to the TaskBot from the Enterprise Control Room when you run the bot with the option Run bot with queue.

Related reference

[Workload package](#) on page 831

The Workload package enables you to insert work items in a queue for workload automation. It also enables data chaining between multiple queues. You can orchestrate multiple bots, and enable optimal device utilization through the queueing mechanism of workload management.

Create workload queues

A queue is one of the main building blocks of Workload Management (WLM). A queue holds data known as Work Items for further processing. The system distributes these Work Items to individual Unattended Bot Runners in a device pool for processing.

For workload automation create device pools, add Bot Runners to the pool, create queues, add queue owners/participants/consumers, define the work item structure, insert work items, and finally run the automation with the queue.

[Create and attach work item template to a Bot](#)

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

[Create device pools and add bot runners to the pool](#)

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

[Create queues](#) on page 1081

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator assigns the AAE_Queue Admin role with View and manage my queues, Create queues, Administer all queues, and View my in progress activity permissions.

[Add queue owners](#) on page 1081

Add queue owners who can create, edit, and view queues.

[Add participants to queue](#) on page 1082

Add queue participants from different roles defined in the Enterprise Control Room. This is an optional step.

[Add consumers of queues](#) on page 1082

Add queue consumers from different roles defined in the Enterprise Control Room. This is an optional step.

[Define Work Item structure](#) on page 1083

Define the Work Item structure for processing in a queue. This enables you to manually upload the Work Items from the system in the absence of ready data in a file.

[Insert Work Items](#) on page 1084

Add Work Items from an Excel or CSV file to the queue after you define the structure.

Related concepts

[Run bot with queue](#) on page 1085

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

Related tasks

[Attach work item template to TaskBot](#) on page 861

Attach a work item template to a TaskBot to use the TaskBot in workload automation.

Create queues

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator assigns the AAE_Queue Admin role with View and manage my queues, Create queues, Administer all queues, and View my in progress activity permissions.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

A queue is processed until all work items are completed. When new work items are added to the queue, the Reactivation Threshold value specifies the minimum number of new work items required to resume queue processing. Work items are those items with a Ready to Run status.

Create a queue by providing details such as the queue name, queue owners, participants, consumers, and work item structure.



Note: You can choose to Create draft of queue and add the remaining information later.

1. Navigate to Workload > Queues.
2. Click Create queue.
3. Enter the Name.
4. Optional: Enter a description.
5. Set the Reactivation Threshold to resume queue processing.
Default threshold is 1 (one).
6. Optional: Select the average Time required for a person to complete one work item:
 - seconds
 - minutes
 - hours
 - days
7. Click Next.

[Add queue owners](#) on page 1081

Related tasks

[Edit queues](#) on page 1089

Edit a queue using two methods - from the Queues list, or from the View queue page.

[Delete Queues](#) on page 1090

Delete selected or all queues.

Add queue owners

Add queue owners who can create, edit, and view queues.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Queue owners are allowed to edit the queue and add new work items to the queue.

The queue creator is the default queue owner and is able to add other Enterprise Control Room users as queue owners, if required.

1. Select user(s) from the Available Users list from the Owners tab.
2. Click the right arrow (→) to add your selection.
3. Click Next.

[Add queue participants](#)

Add participants to queue

Add queue participants from different roles defined in the Enterprise Control Room. This is an optional step.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Participant roles can add new work items and view the queue. However, they are not allowed to edit other queue properties.

1. Select role(s) from the Available Roles list from the Participants tab.
2. Click the right arrow (→) to add your selection.
3. Click Next.

[Add consumers of queues](#) on page 1082

Add consumers of queues

Add queue consumers from different roles defined in the Enterprise Control Room. This is an optional step.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

There are certain mandatory checks that are to be done for unattended bots to be deployed from Enterprise Control Room to a device:

- The device where the bot is to be deployed should be set as a default device to only the specific bot runner account.
- Ensure that all necessary privileges have been granted to the Bot Runner.
- Ensure that nobody is signed into the device at the time of bot deployment with the Run As permission from a different device.
- Ensure that the console is currently inactive on default device.

Queue consumers can view the queue and all the work items in the queue. In addition, they can use this queue for running bots on Unattended Bot Runners.

1. Select role(s) from the Available Roles list from the Consumers tab.
2. Click the right arrow (→) to add your selection.
3. Click Next.

[Define Work Item structure](#) on page 1083

Define Work Item structure

Define the Work Item structure for processing in a queue. This enables you to manually upload the Work Items from the system in the absence of ready data in a file.

Define a Work Item structure using any one of the following methods:

1. Using an Excel/CSV file.
2. Using an existing work item template.
3. Manually



Remember: The work flow to process Work Items differs for a queue based on the method that you choose in the Define Work Item Structure tab.

1. Select a method to add header columns for Work Item processing:

- Use an Excel/CSV file: Add the header columns from an existing Excel or CSV file. You can point to the Excel spreadsheet or CSV file you are using in one or more TaskBots you will run in this queue.
 - a. Enter a unique name for the Work Item structure in the Work item template field.
For example, if the queue contains employee information, you can specify the Work item template as Employee Data.
 - b. Select a column for inclusion in the Work Item structure from the list of column names. The columns are defined based on the header rows of the selected Excel or CSV file. A maximum of ten (10) columns are allowed for selection and viewing in the Enterprise Control Room.
For example, you can select column headers Employee Name, Employee ID, and Designation. You can then select the Data Type - Text, Number, or Date for that column. You can also choose to view these columns being processed in the Activity page.



Note:

- The system allows you to filter/sort Work Items on the columns for viewing the Work Item data in the Enterprise Control Room.

[Actions allowed on view queue page](#) on page 1091

- When you upload work items from an xls orxlsx file with data type as text, the Excel file column populated with a date in any format (for example, 8/6/2019) is converted to its corresponding WLM date format (for example, Sat Jun 08 00:00:00) in the Enterprise Control Room Work Item. However, the same is not applicable to a csv file.

- c. Select up to three columns for sorting in an ascending or descending order.

When the system processes the Work Items from the queue, it uses the sort criteria specified to retrieve the Work Items in that order. For example, to process payslips with first Employee ID followed by Employee Name from 1 to n and A to Z, specify Employee ID and Employee Name in an ascending order.

- Use work item template: Add header columns by searching for an Existing work item template or from the Available work item templates.

This allows you to pass the values or attributes from the template to a TaskBot with the help of Work Item variables when you use the option Run bot with queue.



Tip: Search for an existing Work Item template when there are a large number of templates available for selection.

[Use Work Item variables](#) on page 877

- Manually: Define the Work Item structure manually. You do not have to select from an existing structure.
 - a. Type a name for the Work Item structure in the Work item template field.
For example, if the queue contains employee information, add the Work item template as Employee Data.
 - b. Add column header names for the Work Item and select the data type for each column: Text, Number, or Date
 - c. Select the display and sorting for the columns in the Enterprise Control Room.
When the system processes the Work Items from the queue, it uses the sort criteria specified to retrieve the Work Items in that order. For example, to process payslips with first Employee ID followed by Employee Name from 1 to n and A to Z, specify Employee ID and Employee Name in an ascending order.

2. Click Next to add the Work Items.

[Insert Work Items](#) on page 1084

Related reference

[Work item status and actions](#) on page 1096

Based on the Work Item status, you can do only certain actions on a Work Item.

Insert Work Items

Add Work Items from an Excel or CSV file to the queue after you define the structure.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Add Work Items from an Excel or CSV file to the queue.



Note: When you upload work items from an xls or xlsx file with data type as text, the Excel file column populated with a date in any format (for example, 8/6/2019) is converted to its corresponding WLM date format (for example, Sat Jun 08 00:00:00) in the Enterprise Control Room Work Item. However, the same is not applicable to a CSV file.

You can also add Work Items later by editing the queue, see [Edit queues](#) on page 1089.

1. Click Browse.
 2. Select the Excel or CSV file.
 3. Click Create queue.
- Now that you have created a queue, it is now ready for deployment from a bot.
[Run bot with queue](#) on page 1085
 - Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

[Manage Work Items](#) on page 1094

Run bot with queue

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

To run a bot with queue, ensure you are allocated a combination of any or all of the following roles and permissions:

Feature type	Privileges
User roles	- AAE_Admin - AAE_Queue_Admin - AAE_Pool_Admin
Activity permissions	- View my in progress activity - View my scheduled bots - Schedule my bots to run
Device permissions	- View and manage my Bot Creator, Bot Runner, and device pools - Create device pools - Administer all device pools
Bots permissions	- View my bots - Run my bots
Workload permissions	- View and manage my queues - Create queues - Administer all queues

Use Run a bot with queue from any of the following pages:

1. Activity > Scheduled
2. Bots > My Bots > Public page
3. Workload > Queues page

The procedure for running a bot with a queue is the same in all these pages. To Run bot with queue, note that:

- You can run bots only on Unattended Bot Runners. You cannot run bots on Attended Bot Runners from the Enterprise Control Room.
- The bots have to be Checked in to the Public folder in order for the bots to qualify to be run with queue.

To process the work items using the Bot Runners, choose the TaskBot to run, select a queue, add a Bot Runner, and assign it to a device pool.

Related tasks

[View automation of a queue](#) on page 1093

Use the View activity in progress page to view the automation details of the selected queue, Pause, Resume, or Stop the in-progress automation.

Add TaskBots and dependent files

Add a TaskBot, review the input values, and dependent files for the automation in the Taskbots tab from the Run bot with queue page.

1. Navigate to Activity > Scheduled, Bots > My Bots, or Workload > Queues page.
2. Click Run bot with queue
You are taken to the Activity > Run bot with queues Create page.
3. Enter a Name for the automation.
4. Enter Description.



Tip: This could describe the purpose of running the TaskBot with a queue.

5. Go to the folder that contains the required TaskBot.
6. Select a TaskBot to process in the queue from the list.
By default, the Bots folder is selected.



Tip: Use Search to find a TaskBot quickly.

The Input values and Dependencies options appear at the bottom of the page.

7. Optional: Select the Input values check box to add the values of variables to the bot during run time.
This is enabled only if the selected TaskBot has Input values.
8. Optional: Review the list of dependent files, if available.
This is enabled only if the selected TaskBot has Dependencies.
9. Click Next to add a queue, Bot Runner and device pool.

[Add queue, Bot Runner, and device pool](#) on page 1086

If the selected TaskBot does not contain a work item template, an error message appears at the top of the page.

[Define Work Item structure](#) on page 1083

The TaskBot also has an icon that indicates a missing work item template.

Related reference

[Bot dependencies](#) on page 884

Bots dependencies are files and other bots that are required to run that bot successfully.

Add queue, Bot Runner, and device pool

Add a queue, Bot Runner, and device pool to the automation from the Run bot with queue page.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Automation processes are queued until the specified Run as user and devices become available. Queuing permits other automation processes for that specific Run as user until the specified device becomes available. Any In use queues are shown as disabled in the Available queues list.



Note: For Workload management automations, the device login credentials must be the same for all devices available in a device pool.

You can deploy the automation on the number of users that you choose with the Run as option and not on the total number of devices available in a device pool. Select only those queues that are not in use.



Note: You cannot use multiple queues to add Bot Runners.

1. Select a Queue from the Queues list.
2. Click Next.
3. In the Run as tab, select a Bot Runner from the Available bot runners list.
Select the Run on default Devices option when you want to select Bot Runners that are mapped one-on-one with their default devices. This option enables the Work Items to be deployed only to the user's default device where the security policy does not allow a user to log in to any other device or devices.
If you select this option, ensure that all the default devices are part of the same device pool when you select from the Device Pool tab in Step 5.
4. Click Next.
5. In the Device pool tab, select a Device Pool from the Available device pools list.
6. Click Add.
The queue and device pool are added to the run bot with the queue list.
7. Optional: Click Remove to replace the queue or the device.
8. Click Run bot with queue.
The queue status changes to In use on the Queues page.

Manage workload queues

For workload maintenance tasks such as view the details of queues to pause, stop, or resume its automation, edit the queues, manage the work items in the queue, and delete the queues.

Workload maintenance tasks

For workload automation maintenance, do the following (in any order):

[View queue details](#) on page 1088

Use the View queues details page to view the details of a particular queue.

[Edit queues](#) on page 1089

Edit a queue using two methods - from the Queues list, or from the View queue page.

[Delete Queues](#) on page 1090

Delete selected or all queues.

[Manage Work Items](#) on page 1094

Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

Related reference

[Actions allowed on view queue page](#) on page 1091

Use different actions such as sorting, searching, or filtering on the table view of the queues.

View queue details

Use the View queues details page to view the details of a particular queue.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Permissions required:

1. Queue Owner or Queue Participant or Consumer rights
2. View and manage my Queues feature permission

The View queues page which shows details of the queue:

- New when the work item is added to the queue recently.
- On hold when the work item is deferred from processing by a Queue owner, participant, or consumer.
- Failed when the work item processing failed on an unattended bot.
- Completed when the work item is successfully processed by a Bot Runner or marked Completed by a queue owner, participant or consumer.
- Data error when there is an error in loading data from the file.
- Active when the work item is currently being processed or staged for processing.
- Ready to run when the work item is successfully processed for execution does not have any data errors and can be staged for processing.

Queue contents in different tabs such as:

1. Work Items: This is the default view. This allows you to view all work items in a tabulated form. You can use the filter to view specific work items. For example, all work items with status as Completed. You can View, Edit, or Delete the individual work items in each row. You can also change the status of the work items in bulk. For example, change the status of all the work items in Data error to On hold.
2. General: View the Reactivation Threshold and Time required to complete one work item.
3. Owners: View the user names of queue owners who can edit the queue and add new work items.
4. Participants: View the user names of queue participants who can add new work items and view the queue.
5. Consumers: View the user names of consumers who can view the queue and all the work items in the queue. In addition, they can use this queue when running bots.
6. Work Item Structure: View the work item structure that you defined when creating the queue.



Tip: Edit any of these details by either clicking the edit this queue link or the Edit button. Also, delete the queue by clicking the Delete button.

1. Navigate to Workload > Queues.
2. Hover over the Actions icon for the queue.
3. Click View.

[View automation of a queue](#) on page 1093

Related concepts

[Manage Work Items](#) on page 1094

Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

Related tasks

[Create queues](#) on page 1081

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator assigns the AAE_Queue Admin role with View and manage my queues, Create queues, Administer all queues, and View my in progress activity permissions.

[Edit queues](#) on page 1089

Edit a queue using two methods - from the Queues list, or from the View queue page.

[Delete Queues](#) on page 1090

Delete selected or all queues.

Related reference

[Actions allowed on view queue page](#) on page 1091

Use different actions such as sorting, searching, or filtering on the table view of the queues.

Edit queues

Edit a queue using two methods - from the Queues list, or from the View queue page.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Permissions required:

1. AAE_Queue Admin role.
2. Queue Owner rights to edit queues that you created.
3. Queue Participant rights to edit queues that are created by other queue owners.

Edit a queue from the View queue page or from the Queues list.

1. Navigate to Workload > Queues.
2. Hover over the Actions icon for the queue.
3. Click Edit.
4. Click either of the following to launch the Edit Queue page.
 - edit this queue link.
 - Edit button.
5. Edit the queue details such as the queue name (applicable only if in draft), description, work items, threshold and time values, owners, participants, and consumers.



Note: The Work Item structure cannot be edited after it is defined.

6. Upload a file for the work item that will be used for processing in this queue.

The Work Items tab is shown by default.



Tip: You can search for a work item quickly based either on Status or Status details using the search option.

7. Click Browse.
8. Select the file to upload.



Note: You can upload only an Excel or CSV file.

9. Click Save changes.
10. Edit the name and save the changes made to the queue.
An edit successful message appears.

Related concepts

[Manage Work Items](#) on page 1094

Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

Related tasks

[Create queues](#) on page 1081

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator assigns the AAE_Queue Admin role with View and manage my queues, Create queues, Administer all queues, and View my in progress activity permissions.

Related reference

[Actions allowed on view queue page](#) on page 1091

Use different actions such as sorting, searching, or filtering on the table view of the queues.

Delete Queues

Delete selected or all queues.

Permissions required:

1. AAE_Queue Admin role
2. Queue Owner rights

1. Go to Workload → Queues
2. Delete selected or all queues
 - Delete selected queue
 - a. Hover over a queue to delete.
 - b. Click the Actions menu (vertical ellipsis).
 - c. Click the Delete button.
 - d. A confirmation message to permanently delete the selected queue appears.
 - e. Click Yes, delete to confirm or No, cancel to discard the action.
 - f. A confirmation message appears after you delete the queue
 - Delete multiple selected or all queues
 - a. Select the check box of required queues or select the check-box given in the header to select all queues
 - b. Click the Delete button above the table header.
 - c. A confirmation message to permanently delete multiple queues appears.
 - d. Click Yes, delete to confirm or No, cancel to discard the action.
 - e. A confirmation message appears.



Note: A queue will not be deleted if it is being used for processing a work item. An error message appears for that particular queue.

Related tasks

[View queue details](#) on page 1088

Use the View queues details page to view the details of a particular queue.

[View automation of a queue](#) on page 1093

Use the View activity in progress page to view the automation details of the selected queue, Pause, Resume, or Stop the in-progress automation.

[Edit queues](#) on page 1089

Edit a queue using two methods - from the Queues list, or from the View queue page.

Actions allowed on view queue page

Use different actions such as sorting, searching, or filtering on the table view of the queues.

Searching and filtering

For ease of access, apply search parameters to Status and Queue Name columns.

- Specify the search parameters in the search bar for Queue Name. When you specify search parameters for the same column, the system searches using OR operator. When you specify search parameters for different columns, the system searches using AND operator.
- Choose the search parameters from a list in the search bar for Work Item Status.

Table items

The following describes the list of items that can be viewed in the table:

Table Item	Description
ID	Shows the system generated id for a work item. When a work item is added to a queue, system generates an id for that work item.
Status	Shows Work item status: Use the View queues details page to view the details of a particular queue.
Start Time and End Time	Shows the Work Items processing start/end time and date.
Modified by	Shows the name of the user who had modified the Work Item last.
Last Modified	Shows the time and date when the Work Item was modified last.



Note: Apart from the above system generated columns, the fields that you define in your work item are also displayed as columns.

Actions on table column

Use the following actions on a table column:

- Click a column to sort it in ascending and descending order. You can sort up to three columns by holding the Shift key when you click two more columns. This gives you the option of sorting two additional columns. This way the sorting is done on the entire table and not just the data that is currently visible to you. The last sorting is stored in memory applied by a user per session.
- Drag a column to the left or right
- Move your mouse cursor at the end of the column and drag to re-size

Actions on Work Items

Use the following tasks on specific Work Items:

Table Item	Description
Refresh	Allows you to refresh the table contents so that you can view the latest Work Item status
Delete	Allows you to delete one or multiple Work Items.
Mark complete	Allows you to mark one or more Work Items as Complete whose status is On hold, Data Error, or Ready to run.
New	Allows you to mark one or more Work Items as New whose status is On hold, or Data Error
On hold	Allows you to mark one or more Work Items as On hold whose status is New
Customize columns	Allows you to show or hide specific columns. By default, all columns are displayed including the ones defined in the Work Item.

Alternately, select Work Items and use the following actions. Note that these actions can be performed only at a table level and not on individual Work Items.

Table Item	Description
View	Allows you to view details of selected Work Item.
Edit	Allows you to edit details of selected Work Item. You can see this icon only if you are the Queue Owner or Participant or Consumer and the status of the Work Item is Unsuccessful, On hold, or Data error

Table Item	Description
Delete	Allows you to delete the selected Work Item. Note that if a Work Item is in Active state, you are not allowed to delete it.

Related tasks

[Define Work Item structure](#) on page 1083

Define the Work Item structure for processing in a queue. This enables you to manually upload the Work Items from the system in the absence of ready data in a file.

View automation of a queue

Use the View activity in progress page to view the automation details of the selected queue, Pause, Resume, or Stop the in-progress automation.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Permissions required:

1. AAE_Queue Admin role
2. Queue Consumer or Queue Participant rights
3. Manage everyone's In progress activity feature permission

Note that though the View automation page is accessible from the Workload module, the page is launched from Activity module.

1. Navigate to Workload > Queues.
2. Hover over a queue with status In use
3. Click the Actions menu (vertical ellipsis) and select View automation.

This launches the Activity > Run bot with queue > View page.

- View the automation details of the queue such as:
 - The Bot name, path, dependencies, and if it requires Administrative privileges to run in the Task Bot tab.
 - The Queue used to run the automation in the Queue tab.
 - Bot Runner details such as Username, Device, and user Status in the Run as tab.
 - Details of the device pool in use to run the automation in the Device pool tab.
 - Details such as number of work items that were active, failed, pending, or completed processing in the Run history tab.

- Pause

The system will pause distributing work items from this queue to available bot runners in the device pool.



Note: Until you resume this automation, any work items with Ready to Run status from this queue are not sent for processing.

- Resume

The system will start distributing the work items from this queue.

- Stop

The system stops distributing the work items from the queue associated with this automation.

Select No, cancel to return to the details page or Yes, stop to stop the work item processing and return to the Queues page.

Note that you cannot Pause/Resume or Stop actions directly from the Activity > In progress page. For these actions, the Workload > Queues > View automation action is used.

[Edit queues](#) on page 1089

Related tasks

[View queue details](#) on page 1088

Use the View queues details page to view the details of a particular queue.

[Delete Queues](#) on page 1090

Delete selected or all queues.

Manage Work Items

Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

Permissions required

You need any of the following permissions to manage the work items:

1. AAE_Queue Admin role
2. View and manage my Queues feature permission
3. Queue Owner, Queue Consumer, and/or Queue Participant permissions

View work items

View work items with a status of Completed, Unsuccessful, On hold, Active, or Data Error in the View work item page.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

From the Workload > Queues page, you can perform the following actions on either one queue or multiple queues, including:

- Delete: This will delete the work item permanently.
- Mark complete: This will mark the work item as complete.
- Re-process: This will mark the work item in New state.
- On hold: This will mark the work item as On hold.



Note: The Start time and End time are shown when the work item is being processed.

Select a queue to View, Edit, or Delete a queue.

1. Navigate to Workload > Queues.
2. Hover over the Actions icon for the queue.

3. Click View.

[Edit work items](#) on page 1095

[Delete work items](#) on page 1095

Related reference

[Work item status and actions](#) on page 1096

Based on the Work Item status, you can do only certain actions on a Work Item.

Edit work items

Use the Queues page or the Work item page to edit the work items of a queue.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

You can edit a work item only if it is in a New, On hold, Data error, or Failed state.

1. Navigate to Workload > Queues.
2. Hover over the Actions icon for the queue.
3. Click Edit.
4. Change the work item status to Mark complete, Defer, or Re-process in the Work item attributes and automation details section.

You can reprocess the failed Work Items by editing and modifying from Failed to Re-process.

The system will set the status to Data Error during the data load if there is any issue with the data. For example, if a user enters a text value for a number field, or an invalid date string for an attribute of date type, the status will be displayed as Data Error.

[Work item status and actions](#) on page 1096

5. Click Save changes.

[Delete work items](#) on page 1095

Delete work items

Delete work items one at a time or in bulk in the View work item page.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.



Note: You can also delete a work item one at a time or in bulk using the Delete option provided above the Work items table.

1. Navigate to Workload > Queues.
2. Select the queue.
3. Hover over the Actions icon for the queue.
4. Click Delete.
Confirm or cancel as required.

Related reference

[Work item status and actions](#) on page 1096

Based on the Work Item status, you can do only certain actions on a Work Item.

Work item status and actions

Based on the Work Item status, you can do only certain actions on a Work Item.

Work item - status and actions

The following table provides a description of each Work Item status and the action you can do on a Work Item having that status:

Work Item Status	Description	Actions
New	New Work Item is added	View, Edit, and Delete
Ready to run	Work Item is successfully processed for execution	View, Edit, and Delete
Active	Work Item is currently being processed	View
Completed	Work Item successfully processed by a Bot Runner	View and Delete
Failed	Work Item processing has failed to execute on unattended Bot Runners	View and Edit
Data Error	Data type mismatch when adding Work Items to the queue	View, Edit, and Delete
On hold	Work Item is deferred for use by the Queue admin	View, Edit, and Delete

Related tasks

[Edit work items](#) on page 1095

Use the Queues page or the Work item page to edit the work items of a queue.

[Define Work Item structure](#) on page 1083

Define the Work Item structure for processing in a queue. This enables you to manually upload the Work Items from the system in the absence of ready data in a file.

Managing packages

Users with the Manage package permission can upload and manage packages. Automation Anywhere provides you with the flexibility to decide which packages you want to make available to the Bot Creators for creating bots.

Users must have the appropriate administrative permission to view or manage action packages.

View packages

A user with View packages permission can view the packages that are available to Bot Creators. Go to the Bots > Packages page to view All packages.

Manage packages

The All packages page lists all the packages in the Enterprise Control Room that are available for Bot Creators. Packages can have multiple versions.

A user with the Manage packages permission can add new packages to the Enterprise Control Room and manage which packages versions are available in the Enterprise Control Room.

Add packages from the Bots > Packages > Add package.

Manage packages from the Bots > Packages > All packages > View package page.

Set as default

Select a package and set it as the default. As soon as a package is set to default, it is the package that all Bot Creators in the Enterprise Control Room use.

Disable

Disable a package so that users cannot use it to create new bots. Bots that were created using a disabled package continue to work.

Delete

Deleting a package removes the actions contained in the package from the Enterprise Control Room for all users.



Important: A package cannot be deleted if it is being used by a bot.



Note:

- Existing bots might be affected when existing packages are updated or disabled.
- It is recommended that Bot Creators update bots to use the latest version of a package.

Updates to packages by Automation Anywhere are available in each release of Enterprise A2019. The latest updated package can be set to the default package by users and administrators with Manage package permission.

Watch the following video on how to update a package in Enterprise A2019:

Add packages to the Enterprise Control Room

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Bots > Packages.
2. Click Add package.
3. Click Browse.
4. Locate and select the package to add to the control room.
Packages are Java Archive (JAR) files that contain actions used to create bots.
5. Click Upload package.
6. On the Bots > Packages > Confirm package page, choose any of the following options:

Option	
Reject	Stops the upload process.
Accept, enable and set as default	Uploads and enables the selected package, and setting it to the default package for the Enterprise Control Room.
Accept and enable	Uploads and enables the package, but the package is not set as the default package. Bot Creators have to specifically select non-default packages to use them for creating bots.

Assign credentials to lockers for Bot Creators to access during the bot building process.

Related concepts

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Related tasks

[Manage Enterprise Control Room packages](#) on page 1098

Manage packages in the Enterprise Control Room by setting a package as default, disabling it, or deleting it.

[Set up lockers and credentials in Credential Vault](#) on page 1152

Assign credentials to lockers for Bot Creators to access during the bot building process.

Manage Enterprise Control Room packages

Manage packages in the Enterprise Control Room by setting a package as default, disabling it, or deleting it.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

To manage packages in the Enterprise Control Room, users must have Manage package permission.

Package management actions apply to all users; however, the user can select specific package versions within a bot.

1. Navigate to Bots > Packages.

2. Hover over the Actions icon for the package.
3. Click View.
4. Choose any of the following options:

Option	
Set as default	Select a package and set it as the default. As soon as a package is set to default, it is the package that all Bot Creators in the Enterprise Control Room use.
Disable	Disable a package so that users cannot use it to create new bots. Bots that were created using a disabled package continue to work.
Delete	Deleting a package removes the actions contained in the package from the Enterprise Control Room for all users.
 Important: A package cannot be deleted if it is being used by a bot.	

Related concepts

[Managing packages](#) on page 1096

Users with the Manage package permission can upload and manage packages. Automation Anywhere provides you with the flexibility to decide which packages you want to make available to the Bot Creators for creating bots.

Related tasks

[Add packages to the Enterprise Control Room](#) on page 1098

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

Credentials and lockers in the Credential Vault

The Credential Vault securely stores sensitive information such as passwords, account numbers, and social security numbers in credentials and lockers for use in automation tasks. It facilitates role-based access for users of an Enterprise Control Room and ensures that sensitive values are not stored in bots or on devices.

The Credential Vault consists of two main features: credentials and lockers.

Credential

A credential holds the sensitive information in attributes. An attribute can have a value that is standard for all users or it can accept a user-input value. For example, an Email credential can hold three attributes: `host_name` (standard value), `username` (user input), and `password` (user input).

By default, all users can create, manage, and use their own credentials. A user is granted access to another user's credentials by receiving access to a locker that holds the credential. If the credential requires a user-input value, it appears in the CREDENTIAL REQUESTS tab.

A credential must be assigned to a locker to be used for building and running a bot.

Locker

A locker specifies which users can view, modify, or access the credentials. For example, a human resources (HR) locker can hold **Email**, **Database**, and **Training website** credentials and allow only specific employees of the HR department to use the credentials in their bots.

A user with either the **AAE_Locker Admin** role or a user-created role with the **Manage my credentials and lockers** permission configures lockers, adds credentials, and grants access to other users.

Benefits of using the Credential Vault

Apart from providing a secure and centralized location for storing credentials, using the Credential Vault also:

- Minimizes credential fraud.
- Provides an environment to enable improved security.
- Enables businesses to adhere to the processes and credential management compliance standards.
- Offers increased automation opportunities with secure data applications.

Related concepts

[RBAC for Credential Vault credentials management](#) on page 261

Credentials created in the Enterprise Control Room are used across Bot Creators and Bot Runners.

[Configure Credential Vault Connection mode](#) on page 1137

Credential Vault is a centralized location for securely storing credential information used by bots.

Set up locker and assign credentials

Create a role, credentials, and locker to share related sensitive values with a group of users, so they can use those values to build or run bots.

Do the following to set up the locker and assign credentials:

1. [Create and assign roles](#) on page 1110
Define a role and assign permissions to access various features for building bots.
2. [Create credential](#) on page 1101
Create a credential and add the required attributes.
3. [Create locker](#) on page 1102
Create a locker to group similar credentials and share with other users.

Related concepts

[RBAC for Credential Vault credentials management](#) on page 261

Credentials created in the Enterprise Control Room are used across Bot Creators and Bot Runners.

Related tasks

[Edit a credential](#) on page 1101

Modify credential details and add or remove attributes.

[Edit a locker](#) on page 1103

Add or remove credentials, owners, managers, participants, or consumer roles.

Create credential

Create a credential and add the required attributes.

This task is performed by the Automation Anywhere Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Assign the credential when adding the credential details. If no locker was created, create a locker and then assign the credential. Add up to 50 attributes to a credential.

1. Log in to the Enterprise Control Room as the administrator.
2. Navigate to Bots > Credentials.
3. Enter the Credential name and a Description for the configured credential.
4. Enter the Attribute name and supply the Description for the attribute.
5. Select Input:

Input	Value
Standard	Enter the value. All users see the same credential value set by the credential owner.
User-provided	The value field is not available because the values are not preset during creation. Only users of the locker containing this credential can provide the value.

6. Set Security.
All masked values will be shown as asterisks.
7. Click Create credential.

Assign this credential to a locker.

Edit a credential

Modify credential details and add or remove attributes.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

A credential can be edited by the owner when the credential is not assigned to a locker. If a credential input type is user-provided, then locker consumers can edit the credential to input a value.

[Role-based access and locker permissions](#)

1. Navigate to Bots > Credentials.
2. Hover over the Actions icon for the credential.
3. Click Edit.
4. Edit the credential.

If the email notification setting is enabled and credentials are added to a locker, then all the locker consumers receive an email.

The maximum limit of credential attributes that is allowed is 50. If you have upgraded to the current version and have migrated credentials that have more than 50 attributes, when editing that particular credential, the following message displays: `Credentials can only have a maximum of 50`

`attributes`. To continue, remove the additional attributes that cannot be saved and add those to a new credential.

5. Click Save changes.

Related reference

[Credential Vault email notifications](#) on page 1103

When the email notification setting is enabled, it ensures that users are notified of any changes to credentials and lockers.

Create locker

Create a locker to group similar credentials to share with other users.

You must either have the **AAE_Locker Admin** role or **Manage my credentials and lockers** permission. [RBAC for Credential Vault credentials management](#) on page 261

One locker can hold up to ten credentials. A credential can only belong to one locker. See [Create credential](#) on page 1101. Credentials are further divided in logical groups called lockers.

To create a locker, follow these steps:

1. Navigate to Bots > Credentials > My Lockers.
2. Click Create locker.
3. Enter the Name.
4. Optional: Enter a description.
5. Select the Credentials to add to the locker.
6. Click Next.
7. Add the Owners.

A locker must have at least one owner. The locker owner can edit, view, and delete a locker and also add or remove other owners.

8. Click Next.
9. Optional: Add the Managers and click Next.

The locker manager can view, edit and delete the locker, and add participants but cannot add owners or managers to the locker.

10. Optional: Add the Participants and click Next.

A locker participant has access to view a locker and add their own credentials to a locker.



Note: A locker participant does not have access to or visibility of credentials created by other users.

11. Add the Consumers.

Select one or more roles. Users with these roles have access to the locker. System-created roles are not shown in the Consumers list.

Type	Permission
Standard	Locker consumers can view the locker and all the credentials inside the locker. All consumers see the same credential value set by the credential owner.
User-provided	Locker consumers can input their information in user-provided credentials with user-provided attributes.

- Click Create locker.

If the email notification setting is enabled, users receive an email confirming the locker name and their permissions to that locker.

Edit a locker

Add or remove credentials, owners, managers, participants, or consumer roles.

Only a locker owner or locker admin can edit a locker. To edit a locker, follow the steps mentioned below:

- Navigate to Bots > Credentials > My Lockers.
- Hover over the Actions icon for the locker.
- Click Edit.
- You can make changes to the following:

Option	
Credentials	Add or remove credentials that are assigned to a locker.
Owners	Add or remove locker owners.
	 Note: A locker must have at least one owner.
Managers	Add or remove locker managers.
Participants	Add or remove locker participants.
Consumers	Add or remove locker consumers.

If email notification setting is enabled and credentials are added to a locker, then all the locker consumers will receive an email.

- Click Save changes.

Credential Vault email notifications

When the email notification setting is enabled, it ensures that users are notified of any changes to credentials and lockers.

Overview

Email notifications are sent for the following scenarios:

Credential is added to a locker

When credential is added to a locker, a notification is sent to all consumers of the locker to their email address registered in the Enterprise Control Room. The email consists of a link to the credential that is added to the locker. The consumers are redirected to edit the credential page wherein they input the credential value.

Member is added or removed from a locker	An email notification is sent when a new member (co-owner or participant) is added to a locker or removed from the locker as a member of participant.
Change in permission for locker members	When a locker owner/admin grants or removes locker membership permissions from a locker, an email notification is sent to the locker members at their email address. This ensures that members are notified of their membership changes within the locker.
Locker consumer gets added or removed from a role assigned to a locker, or consumer role gets added or removed from a locker	When a role assigned to a locker is modified by addition or removal of users, an email notification is sent to the new or existing user at their email address so that the consumers are notified that credentials are pending for their input in the locker. Also when a new role added to a locker or an existing role is revoked from the locker, an email notification is sent to the new or existing consumers at their email address so that the consumers are made aware of the changes.

Administration

Enterprise Control Room administrators manage settings related to the database, Credential Vault, users, roles, action packages, licensing, and more.

Learn more about:

Related tasks

[Create and assign roles](#) on page 1110

Administrators configure roles with permissions to access features and perform operations such as create, edit, or delete a bot in the Enterprise Control Room.

[Create a user](#) on page 1106

Create a user and assign their specific license based role.

[Installing additional licenses](#) on page 1145

Upload new licenses to the Automation Anywhere Enterprise Control Room to be distributed to users as required.

[Create credential](#) on page 1101

Create a credential and add the required attributes.

User management

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

Column actions

- Click a column header to sort by ascending or descending order.

- Drag and drop a column header to move the column left or right.
- Drag the end of a column corner to re-size.

Individual user actions

Perform the following tasks on an individual user:

View	Opens the View user page in read-only mode. It shows user details, assigned roles, and general details such as Last Modified, Modified by, Object type, and User type. You can edit a user detail and enable or disable a user.
Edit	Opens the Edit user page in write mode. You can update user details, device login credentials, assigned roles, and device licenses. When you edit a user, an email is sent notifying the user if SMTP is enabled. Only user devices with the Bot agent installed at the system level are available for selection as the default device.
Enable Disable	Activates or deactivates the user. When you enable or disable a user, an email is sent notifying the user if SMTP is enabled.
Delete	Deletes the user. This is useful when users leave an organization or move to another role. This frees both the device to which the user was attached and the allocated license. When you delete a user, an email is sent notifying the user if SMTP is enabled.

Table-level actions

Perform the following tasks by hovering the mouse over the icons at the top-right of the User table. These actions can be performed only at a table-level and not on individual items.

Create role with checked items	Adds a role and assigns the selected users. Create a user on page 1106
Delete checked items	Deletes the selected users. You cannot delete a user who is currently logged in.
Export to CSV	Exports the selected users in the table in CSV format.
Refresh	Refreshes the table and reflects the latest data.
Customize columns	Select the columns to show or hide in the table.

Create a user

Create a user and assign their specific license based role.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Users.
2. Click Create user.
3. Enter the following user details:



Note: The number of characters allowed in First name and Last name is 50.

Field	Value
Enable User	Select for the user to be able to log in immediately.
Username	Enter a unique user name.
Description	Enter a description for the user.
First name	Enter the first name for the user.
Last name	Enter the last name for the user.
Password	Enter and confirm a password for the user. Ensure the password follows any necessary password policy.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. All important Enterprise Control Room notifications will be sent to this email address.



Note: You can use the @ character to accommodate email usernames.

4. Select a Role from the list of Available roles.
5. Click the right arrow (→) to add your selection.
6. Assign a device license to the user.

License	Privilege
None	The user will have access to the Enterprise Control Room only.
Bot Creator- Development license	Enables user to create and run bots. Auto login enabled by default.
Unattended Bot Runner- Run-time license	Users with this license can perform all automation tasks that attended users can perform. Additionally, this license can also be used for Enterprise Control Room deployment, centralized scheduling, and API-based deployment.

License	Privilege
Attended Bot Runner- Run-time license	Users with this license can run bots on their devices. These users can also make use of local schedules and triggers for time or event based automation.
Citizen Developer- Development license	Users with this license can create and run bots (including bots with triggers) on their devices.

The Bypass legal disclaimer option is automatically enabled to allow the user to run bots on a device without having to manually acknowledge a disclaimer.

7. Click Create user.

Watch the following video on how to create a user in Enterprise A2019:

Create an Active Directory user

Add the Active Directory user by selecting the AD domain, providing AD environment details, and assigning a role and device license.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Users.
2. In the General Details section, enter the following information:
 - a) Enable User: Select this option so that the user can log in immediately.
 - b) Active Directory domain: Select the active directory name for the user.
The list displays all the domains that are available in the Active Directory domain controller.



Note: Enterprise Control Room Active Directory supports single forest multi-domain environment.

- c) Username: Click CHECK NAME IN ACTIVE DIRECTORY.
 - If the user name is present in the Active Directory database, the First name, Last name, Email, and Confirm email fields are automatically populated.
If the data is not automatically populated, enter the details in the fields.
 - If the username is not present in the Active Directory database, an error message is displayed. Contact the network administrator to resolve the issue.

If SMTP is enabled, the user is sent an email to this address to confirm the account. All important Enterprise Control Room notifications will be sent to this email address. You can use the "@" character to accommodate email user names.

3. Select a Role from the list of Available roles.
4. Assign a device license to the user.

License	Privilege
None	The user will have access to the Enterprise Control Room only.

License	Privilege
Bot Creator- Development license	Enables user to create and run bots. Auto login enabled by default.
Unattended Bot Runner- Run-time license	Users with this license can perform all automation tasks that attended users can perform. Additionally, this license can also be used for Enterprise Control Room deployment, centralized scheduling, and API-based deployment.
Attended Bot Runner- Run-time license	Users with this license can run bots on their devices. These users can also make use of local schedules and triggers for time or event based automation.
Citizen Developer- Development license	Users with this license can create and run bots (including bots with triggers) on their devices.

The Bypass legal disclaimer option is automatically enabled to allow the user to run bots on a device without having to manually acknowledge a disclaimer.

- Click Create user.

Create a Citizen Developer user

A Citizen Developer is a business user who can build and run bots on their devices, which then function as their digital assistants.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

- Navigate to Administration > Users.
- Click Create user.
- Enter the following user details:
 - Select the Enable User option if you want the user to be able to log in immediately.
 - Enter a unique user name.
 - Optional: Enter a description for the user.
 - Optional: Enter the first name and last name.



Note: The number of characters allowed for the first and last name is 50.

- Enter and confirm a password for the user.
Ensure the password follows any necessary password policy.
 - Enter and confirm the email address for the user.
If SMTP is enabled, the user is sent an email to this address to confirm the account. All Enterprise Control Room notifications will be sent to this email address.
- Select a Citizen Developer role from the list of Available roles.
If there is no Citizen Developer role available, create one in Enterprise Control Room.
[Create a Citizen Developer role](#) on page 1121
 - Click the right arrow (→) to add your selection.

6. Assign the Citizen Developer license to the user.

The license enables users access to the Enterprise Control Room only and enables them to create and run bots.

The Bypass legal disclaimer option is automatically enabled to allow the user to run bots on a device without having to manually acknowledge a disclaimer.

7. Click Create user.

Reset user password

The Enterprise Control Room administrator generates an email process for the user to reset their password.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

The change password email process.

1. Navigate to Administration > Users.
2. Select user from the list.
3. Click Edit.
4. Select Send reset password email.



Note: If there is no email server configured, follow these steps to reset the password for a user:

- a. Open the URL for the Enterprise Control Room in your browser.
- b. Enter the user name, click Forgot Password, and follow the prompts to reset or change the password.
- c. Enter the user name, click the Forgot Password button, and follow the prompts to reset or change the password.

The selected user receives an email with the necessary instructions to reset the password.

Related tasks

[Log in to Automation Anywhere Enterprise Control Room](#) on page 398

To log in to Enterprise A2019, open the Enterprise Control Room URL in your browser, enter your credentials in the login screen, and click Log in.

Roles

The Enterprise Control Room enforces role-based access control. There are two types of roles: system and user-created.

Role-based access control (RBAC) gives users access to specific features, based on the assigned roles and the accessibility provided to the user. The benefits of creating roles include:

- Increased security through controlling users access according to their specified roles.
- Decreased need of customer support.

- Easy and accurate monitoring of the use and access of data by higher management, leading to better research management.

System roles

These roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted.

[System roles](#) on page 1122

User-created roles

Users create these roles and the roles can be customized. If a user-created role is created with all Enterprise Control Room permissions, it is not considered an Enterprise Control Room Admin role. Only the system-created AAE_Admin role has this privilege.

[Create and assign roles](#) on page 1110

Create and assign roles

Administrators configure roles with permissions to access features and perform operations such as create, edit, or delete a bot in the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Assign specific permissions to each user. Users shown as disabled cannot be selected if they have been deactivated by an Administrator.

Follow these steps to create the role:

1. Navigate to Administration > Roles.
2. Click Create role.
3. Enter the Name.
4. Optional: Enter a description.
5. Select the feature permissions.

For more information on the available feature permissions by product, see [Feature permissions for a role](#) on page 1111.

6. Click Next.
7. If either of the below conditions are true, do the following.

Option	
If you selected the View my bots permission:	Select the bots permissions. Bot permissions for a role on page 1119
If you selected the Run my bots permission	Select the Bot Runner devices.

8. Click Next.
9. Select user from the list.
10. Click Create role.

Related concepts

[Bot permissions for a role](#) on page 1119

Assign bot permissions when creating a role with the View my bots feature permission.

Related reference

[System roles](#) on page 1122

System roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted. Administrators assign the roles to users to enable them to access features and perform operations in the Enterprise Control Room.

Feature permissions for a role

A user with the AAE_Admin role or a custom role with the Manage roles permission can create and assign roles to users to provide them with access to features and operations.

We recommend that you create individual roles with specific permissions. You can then assign the limited roles to users with just that specific permission requirement.

Automation Anywhere Robotic Interface (AARI)

Permission	Description
Cross Team Read	View all teams and see the team members
Cross Process Read	View all processes and see team members and managers
Team Management	Create and view teams, edit team names, descriptions, and process tags. Add new teams, team members, and assigned processes
Task Management	Submit and view tasks from processes that are assigned to the team
Case Management	Create and view requests from processes that are assigned to the team
Global Case Management	View process requests and tasks.  Note: This permission does not grant the ability to create a request or submit a task
Global Process Management	View checked-in public processes and assigned managers and teams, edit process tags, and assign managers and teams  Note: This permission does not grant the ability to create a process.
Global Team Management	View teams and assigned users, edit team names and descriptions. Add new processes, managers and users to a team  Note: This permission does not grant the ability to create a team.

API

Permission	Description
Bot Insight Data API	Allows access to Bot Insight RESTful APIs to the data logged by the Enterprise Control Room and by a task during production runs.
Generate API-Key	Users can generate an apiKey that can be used in the Authentication API. Authenticate with username and password API on page 1172  Note: Users without the generateapikey permission can use APIs by authenticating using their username and password. Authenticate with username and apiKey API on page 1174

Activity

Permission	Description
View my In progress activity	All users can view their own activity.  Note: All roles have this permission by default.
Manage my In progress activity	Users can pause, resume, or cancel their own activity and move their finished activities to history.
View everyone's In progress activity	A user can monitor ongoing automations where the user has either run or schedule access on the respective bot.
Manage everyone's In progress activity	A user can monitor and manage ongoing automations where the user has either run or schedule access on the respective bot. Users can also move the finished automations to history.
View my scheduled bots	Users can see their scheduled bots regardless of which user scheduled the bot.
Schedule my bots to run	It requires permission to view and manage Bot Runners.
Edit my scheduled activity	Users can edit their scheduled bots, even if the bots are scheduled by a different user.
Delete my scheduled activity	Users can delete schedules for any of their bots regardless of which users scheduled the bot.
View and manage ALL scheduled activity from my Folders	Users can view, edit, and delete all the schedules on the bot folders that the user has access to. This includes the schedules that the user created or schedules created by other users.
View and manage ALL scheduled activity	Users can view, edit, and delete all the schedules in the system. This includes the schedules that the user created or schedules created by other users.

Audit log

Permission	Description
View everyone's audit log actions	Users can view all audit log activity for the Enterprise Control Room

Bots

Permission	Description
View my bots	Allows users to view the bots they created and bots that were assigned to them.  Note: You must assign this permission before assigning any other bots permissions.
Run my bots	Allows users to run the bots they created and bots that were assigned to them.
Export bots	Allows users to export bots and related bot dependencies for which they have download permission.
Import bots	Allows users to import bots and bot dependencies for which they have upload permission.
Create folders	Allows users to create folders within the folders that they have access to.
Rename folders	Allows users to rename the folders they have access to.  Note: Only empty folders can be renamed.
Cancel checkout	Allows users to cancel bot checkout and unlock the file from the public repository.

Bot Store

Permission	Description
View Bot Store	User can view Bot Store.
Add bots from Bot Store to My Bots	User can add bot packages from Bot Store to their Enterprise Control Room private workspace.
Submit bots to Bot Store	User can submit bot packages to Bot Store.

Credentials and lockers

Permission	Description
Manage my credentials and lockers	User can create, edit, and delete their own credentials. In addition, the user can interact with credentials from their assigned lockers.  Note: All roles have this permission by default.
Manage my lockers	User can create and manage their own lockers.
Create standard attributes for a credential	User can create a standard attribute for a credential that is shared across all users of that credential .
View and edit ALL credentials attributes value	User can view and edit attributes that belong to other users.
Bot Auto-Login Credentials API	User can automate the login process to run bots remotely.



Note: A user with the **AAE_Locker Admin** role can view all credentials and lockers in the Enterprise Control Room. See [System roles](#) on page 1122.

Dashboards

Permission	Description
View dashboards	View dashboard.  Note: All roles have this permission by default.

Devices

Permission	Description
Register device	Allows users to register a local host device. Devices on page 1067
View and manage ALL devices	Allows users to view and manage all devices in the Enterprise Control Room.
Delete devices	Allows users to delete devices that they registered.
Edit the devices	Allows users to edit the devices that they have permission to see.
View and manage myBot Creators, Bot Runners and device pools	Allows users to view and manage Bot Creators, Bot Runners, and device pools.  Note: All roles have this permission by default.

Permission	Description
Create device pools	Allows users to create and manage their own device pools.



Note: A user with the `AAE_Pool1 Admin` role is able to manage all device pools in the Enterprise Control Room. See [System roles](#) on page 1122.

Discovery Bot process

Permission	Description
View assigned process	Allows users to view assigned processes. Note: This is the standard permission. You must assign this permission before assigning any process discovery permissions.
View all processes	Allows users to view all the defined processes.
Edit process	Allows users to create and edit processes.

Discovery Bot recording

Permission	Description
View all recordings	Allows users to view all recordings.
View own recording	Allows users to view their own recording. Note: You must assign this permission before assigning any of the permissions below.
Run recorder and create recording	Allows users to run recorder and create recording.
Edit own recording	Allows users to edit their own recording.
Delete own recording	Allows users to delete their own recording.

Discovery Bot aggregation

Permission	Description
View all aggregation	Allows users to view all aggregations.
View own aggregation	Allows users to view their own aggregations. Note: You must assign this permission before assigning any of the permissions below.

Permission	Description
Create or delete own aggregation	Allows users to create and delete aggregations.
Edit aggregation	Allows users to update aggregations.
View system generated aggregation	Allows users to view system aggregations.

Discovery Bot opportunity

Permission	Description
View all opportunities	Allows users to view all opportunities.
View opportunity	Allows users to view opportunities within assigned process.  <u>Note: You must assign this permission before assigning any of the permissions below.</u>
Create or delete opportunity	Allows users to create and delete opportunities within the assigned process.
Convert to bot	Allows users to convert an opportunity to a bot.
Export opportunity	Allows users to export an opportunity.

Event Triggers

Permission	Description
View event triggers	Allows users to view event triggers.
Manage event triggers	Allows users to view and manage event triggers.  <u>Note: You must assign the view permission before assigning this permission.</u>

IQ Bot

Permission	Description
View IQ Bot	Allows users to view the default dashboards in the IQ Bot portal.  <u>Note: You must assign this permission before assigning any of the other IQ Bot permissions.</u>

IQ Bot administration permissions

Permission ID	Description
View Administration	Allows users to access the Administration tab in the IQ Bot portal.  Note: You must assign this permission before assigning any other administration permissions.
View and manage settings	Allows users to manage the IQ Bot portal advanced configuration settings.
View and manage migration	Allows users to access the migration utility to import and export learning instances in the IQ Bot portal.

IQ Bot domains permissions

Permission	Description
View domains	Allows users to view all domains in the IQ Bot portal.  Note: You must assign this permission before assigning any other domain permissions.
Create domains	Allows users to create domains in the IQ Bot portal.
Import domains	Allows users to import domains in the IQ Bot portal.
Export domains	Allows users to export domains in the IQ Bot portal.

IQ Bot learning instance permissions

Permission	Description
View learning instances	Allows users to view their learning instances in the IQ Bot portal.  Note: You must assign this permission before assigning any other learning instance permission.
View learning instances from the same role	Allows users to view learning instances created by other users with the same role in the IQ Bot portal.
View ALL learning instances	Allows users to view all learning instances in the IQ Bot portal.
Launch validator	Allows users to access the IQ Bot Validator to review and update documents with exceptions.
Create learning instances	Allows users to create learning instances in the IQ Bot portal.
Edit learning instances	Allows users to edit learning instances in the IQ Bot portal.

Permission	Description
Delete learning instances	Allows users to delete their learning instances in the IQ Bot portal.
Send learning instances to production	Allows users to send their learning instances to production in the IQ Bot portal.
Train learning instance groups	Allows users to train their learning instance groups in the IQ Bot portal.

Package manager

Permission	Description
View packages	Allows users to view packages.
Manage packages	Allows users to view and manage packages.

Licenses

Permission	Description
View licenses	Users can view the license details for the Enterprise Control Room.
Manage user's device licenses	Users can assign device licenses to other users.
Install licenses	Users can install Automation Anywhere Enterprise licenses for the Enterprise Control Room.

Migration

Permission	Description
View migration	Users can view new migrations, but not run them  Note: You must assign this permission before assigning the manage migration permission
Manage migration	Users can view and run new migrations
Allow a Bot Runner user to run migrations	Allows Bot Runner Run-as user to update the bot conversion status in the Enterprise Control Room

Settings



Note: Only a user with the `AAE_Admin` role has the ability to view and manage settings in the Enterprise Control Room. See [System roles](#) on page 1122.

Users and roles

Permission	Description
View users	Users can only view all other users in the system. They cannot create, edit, or delete users.  Note: You must assign this permission before assigning the <code>Create user</code>, <code>Update user</code>, or <code>Delete user</code> permission.
Delete users	Users can delete other users the Enterprise Control Room.
Create users	Users can create new users in the Enterprise Control Room.
Edit users	Users can edit all users in the system.
View roles	Users with this permission are able to view the roles in the Enterprise Control Room.  Note: You must assign this permission before assigning the <code>Manage roles</code> permission.
Manage roles	Users can view and manage all roles in the Enterprise Control Room.
View users and roles basic information	Users can view basic information on users and roles.

Workload

Permission	Description
View and manage my queues	Allows users to view and manage their own schedules.
Create queues	Allows users to create and manage their own queues.
SLA Calculator	Allows users to calculate workload Service Level Agreements (SLA).

 Note: A user with the `AAE_Queue Admin` role has all the above permissions. In addition, the `AAE_Queue Admin` is able to manage all the queues in the Enterprise Control Room. See [System roles](#) on page 1122.

Bot permissions for a role

Assign bot permissions when creating a role with the `View my bots` feature permission.

Permission	Description
Select all	Enables users to check in, check out, view, delete, run, and schedule bots.
Run/Schedule/Run and Schedule	Enables users to run and schedule bots when the role has the <code>Run my bots</code> and <code>Schedule my bots to run</code> feature permissions.  Note:

Permission	Description
	- This permission is limited to running bots when the role has only the Run my bots feature permission. - This permission is limited to scheduling bots when the user has only the Schedule my bots to run feature permission.
Check in	Enables users to check in bot files or folders to the public workspace from their private workspace. When this permission is selected, the Clone and View content permissions are automatically enabled. These permissions can only be disabled by an user with the AAE_Admin role .
Check out	Enables users to check out bot files or folders from the public workspace. It creates an editable copy of the bot in the private workspace. A bot can be checked out by one user at a time. When this permission is selected, the Clone and View content permissions are automatically enabled. These permissions cannot be disabled.  Note: To check out dependent folders and files, you must have the Check out permission on the dependency folders.
View content	Enables users to view the contents of a bot. This permission applies to both the public and private workspaces. To create a copy of the cloned bot or file in the private workspace, you must have the View content permission on the same folder in the public workspace.  Note: You must have the View content permission enabled to export a bot and its dependencies.
Clone	Enables users to create a read-only copy of the bot from the public workspace to their private workspace. A bot can be cloned by multiple users. The Clone permission must be assigned at the folder level for the bot in the public workspace. To clone a dependency folder, you must have the Clone permission on the dependency folder.  Note: - If you have cloned a bot and the corresponding public folder is deleted, then there will be no classifications on the cloned bot in your private workspace. Copy, view, or delete permissions will be available at the bot level. - You cannot move or rename a cloned bot in your private workspace. You must have the View content permission on the same folder in the public workspace to view the contents of your cloned bot in the private workspace.
Delete	Enables users to remove files and their dependencies from the public workspace.

Related tasks

[Create and assign roles](#) on page 1110

Administrators configure roles with permissions to access features and perform operations such as create, edit, or delete a bot in the Enterprise Control Room.

Create a Citizen Developer role

Create a Citizen Developer role with the necessary bot permissions in the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Although you can create a custom Citizen Developer role and assign the corresponding permissions, ensure that the Citizen Developer role has the necessary permissions mentioned in this procedure.

1. Navigate to Administration > Roles.
2. Click Create role.
3. Enter the Name.
4. Optional: Enter a description.
5. Select the following feature permissions:
 - Event triggers
Select the View and manage my event triggers option to allow the user to view, run trigger-based automation, or delete event triggers.
 - Bots
Select the View my bots option and the following permissions:
 - Run my bots
 - Import bots
 - Cancel checkout
 - Devices
Select the following permissions:
 - Register device
 - View and manage ALL device(s)
 - Edit the device(s)
6. Click Next.
7. Click Create role.

A Citizen Developer role is created in the Enterprise Control Room. You can create a Citizen Developer user and assign this role to that user.

[Create a Citizen Developer user](#) on page 1108

System roles

System roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted. Administrators assign the roles to users to enable them to access features and perform operations in the Enterprise Control Room.

Enterprise A2019 roles

Role	Permissions	
AAE_Admin This role allows access to all features, it enables users to create other Admin users, and access to all folders and files in the public workspace. This is the only role that can access Enterprise Control Room settings.	Dashboard	View dashboards
	Activity	- View and manage my in progress activity - View and manage everyone's in progress activity - View my scheduled bots - Schedule my bots to run - Edit my scheduled activity - Delete my scheduled activity - View and manage ALL scheduled activity from my folders - View and manage ALL scheduled activity
	Event Triggers	View and manage event triggers.
	Bots	- View and run my bots - Import and export my bots - Create and rename folders - Manage my credentials and lockers - Create standard attributes for a credential - Bot Auto-Login credential API
	Package Manager	View and manage packages
	Devices	- Register device - View and manage ALL devices - View and manage my Bot runners, Bot creators and device pools
	Workload	- View and manage my queues - Administer ALL queues - SLA Calculator

IQ Bot roles

Role	Permissions	
AAE_IQ Bot Validator For a Bot Runner with an IQ Bot license. Permissions to access the IQ Bot Validator screen. Limited access to Enterprise Control Room features.	Dashboard	View dashboards
	Activity	View my In progress activity
	Bots	• Manage my credentials and lockers • Create standard attributes for a credential
	Devices	View and manage my Bot runners, Bot creators and device pools
	Workload	View and manage my queues
	Audit Log	View all audit log actions.
	Administration	View Users and Roles basic information
AAE_IQ Bot Services Permissions to access the IQ Bot console. Limited access to Enterprise Control Room features.	Dashboard	View dashboards
	Activity	View my In progress activity
	Bots	• Manage my credentials and lockers • Create standard attributes for a credential
	Devices	View and manage my Bot runners, Bot creators and device pools
	Workload	View and manage my queues
	Audit Log	View all audit log actions.
	Administration	View Users and Roles basic information

Bot Insight roles

[Roles to access Bot Insight](#) on page 1316

Discovery Bot roles

Role	Permissions	
AAE_Discovery Bot Admin Allows access to view all Discovery Bot processes. Manages the creation, deletion, and editing of processes.	Dashboard Activity Bots Devices Workload Administration Discovery Bot	View dashboards View my In progress activity Manage my credentials and lockers View and manage my Bot runners, Bot creators and device pools View and manage my queues View Users and Roles information - View all processes - Edit process
AAE_Discovery Bot Analyst Allows access to view and edit all approved recordings from assigned users for a given process. Permissions for system generated aggregated view of recordings to view, create, edit, and delete views. Permissions to create, view, edit, and delete opportunities for assigned processes. Export the opportunity to a word document and convert to a bot.	Dashboard Activity Bots Devices Workload Administration Discovery Bot	View dashboards View my In progress activity Manage my credentials and lockers View and manage my Bot runners, Bot creators and device pools View and manage my queues View Users and Roles basic information - View assigned processes - View all recordings - View all aggregation - View own aggregation - Create or delete own aggregation - Edit aggregation - View system generated aggregation - View opportunity - Create or delete opportunity

Automation Anywhere Robotic Interface roles

Role	Permissions	
AAE_Robotic Interface Admin	Dashboard	View dashboards
	Activity	View my In progress activity
	Bots	Manage my credentials and lockers
	Devices	View and manage my Bot runners, Bot creators and device pools
	Workload	View and manage my queues
	Administration	• View and edit users • View Users and Roles basic information
	AARI	• Cross team read • Cross process read • Global case management • Global process management • Global team management
AAE_Robotic Interface Manager	Dashboard	View dashboards
	Activity	View my In progress activity
	Bots	Manage my credentials and lockers
	Devices	View and manage my Bot runners, Bot creators and device pools
	Workload	View and manage my queues
	Administration	• View and edit users • View Users and Roles basic information
	AARI	• Team management • Case management • Task management

Active Directory role mapping

The role mappings feature maps Active Directory (AD) security groups to one or multiple roles in the Enterprise Control Room.

Role to AD mapping enables the Enterprise Control Room to synchronize with the AD, assign roles to users, and enable user access to objects such as bots, devices, folders, credentials, and Credential Vault lockers.

If you have Active Directory security groups, map these security groups to roles through the Enterprise Control Room. When users are created, they automatically inherit the roles assigned to their AD security groups. Security group role assignments to users are updated with every Enterprise Control Room to Active Directory sync.

User creation	All the security groups that a user belongs to in the AD are retrieved and roles are automatically assigned to that user based on the mappings.
User login	Every time a user logs in, the Enterprise Control Room validates the mappings, the current security group memberships, and assigned roles before confirming any required changes.
Automated background process	This process is initiated based on the defined time period set on the Active Directory role mappings page. The process synchronizes all the mappings before synchronizing roles for every user in the Enterprise Control Room based on the updated mappings. All the roles assigned through role mappings are designated as system-assigned roles. The Enterprise Control Room admin can assign additional roles to users if required. However, the system-assigned roles of the users cannot be removed.



Note: The system-assigned roles can be changed or removed only from mappings.

Nested mapping currently not supported

For example, assume that an AD has a parent group called `pGroup` and a child group called `cGroup`. The user `Pau1` is part of the `pGroup`. In the Enterprise Control Room, a mapping is created to map `pGroup` to `Role1` and `Role2`. Another mapping is created to map `cGroup` to `Role3`.

Only direct mapping is supported in the Enterprise Control Room, so `Pau1` is automatically mapped to only `Role1` and `Role2`, and not `Role3`.

Create Active Directory role mapping

Map a single AD security group to one or more Enterprise Control Room roles. Create the mapping before synchronizing the user and roles during the user login or background process.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Create any roles you want to use with the Active Directory security groups. You can also use the default roles shipped with Automation Anywhere Enterprise.

While there is a nested grouping relationship in the AD, there is no such relationship in the Enterprise Control Room because they are all one-to-one mappings.

1. Navigate to Administration > Roles.
2. Click Active Directory Role Mapping.
3. Click Create Role Mapping.
4. Enter the Name.
5. Click the Active Directory domain drop-down and select an available domain.
6. Use the Active Directory security group field to search for a group.
For example, if you have a group named `Certified Publishers`, search for `Certified`. All the groups that contain `Certified` in their name are listed in GROUPS.
7. Click the right arrow (→) to add your selection.
8. Select a Role from the list of Available roles.
9. Click the right arrow (→) to add your selection.
10. Click Create Mappings.

When the LDAP sync runs, all users with the assigned roles are updated.

Edit Active Directory role mapping

As an Automation Anywhere Enterprise administrator, edit the Active Directory security group mappings assigned to roles in the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Ensure that the mapping name is unique and cannot be duplicated. If you rename a map with an existing mapping name, an error message appears stating that the same name already exists. Changes to mapping name or roles are updated in the audit log.

1. Navigate to Administration > Roles.
2. Click Active Directory Role Mapping.
3. Hover over the Actions icon for the role and select Edit role mapping.
4. Supply any required changes for Role Mapping.
Edit the roles by either adding or removing roles from the Available roles list, except Bot Insight roles. If you assign Bot Insight roles, an error message appears stating that the role mapping cannot be updated as it contains unsupported roles.



Note: The rest of the fields cannot be edited.

5. Click Save changes.

When the LDAP sync runs, all users with the assigned roles are updated.

Sync Active Directory role mapping

Manually or automatically synchronize (sync) role mappings between the Active Directory and Enterprise Control Room.

Automatically synchronize Active Directory role mapping

By default, synchronizing between Active Directory and Enterprise Control Room occurs after every time to live (TTL) interval. Edit the `um.properties` file to change the TTL interval for chronjobs.

Run LDAP auto discovery for AD



Recommendation: As this can be a time-consuming and an expensive operation, set the role synchronization time period to the default value of 1440 minutes (1 day).

Manually run or restart synchronizing Active Directory role mapping

To run or restart automatic synchronizing between the Active Directory and Enterprise Control Room, do this: From the Enterprise Control Room go to the Active Directory role mappings page and click the Sync roles from Active Directory option.

This starts the synchronizing process immediately and continues to run it automatically based on the time interval set.

Cancel automatic synchronizing Active Directory role mapping

To cancel automatic synchronizing between Active Directory and Enterprise Control Room, do this: From the Enterprise Control Room go to the Active Directory role mappings page and click the Cancel Sync option to turn off the periodic automatic sync.

Events that require Active Directory role mapping sync

Sync the role mappings whenever these events occur:

- Changes to AD groups

If any group that is mapped is deleted from the AD, the mappings must be validated before they are deleted because the group is no longer available.

- Update to the license file

Updating the license file can change the available roles. Mappings must be synchronized before updating the roles.



Note: After a sync, the user must wait a few seconds for the updated changes to appear.

View Active Directory role mapping

An administrator or a user with permission to view and manage roles can view the details of the available Active Directory role mappings.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Roles.
2. Click Create Role Mapping.
3. Enter an available mapping name in the search box next to the Mapping Name drop-down list.
Optionally, you can use the Active Directory security groups to search for any available AD security groups.
4. Hover over the Actions icon for the role and select View role mapping.

One or more available role mappings that match your search criteria appear in the Role Mapping table.

Delete Active Directory role mapping

An administrator or a user with permission to view and manage role can delete role mappings listed in the Role Mapping table.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Roles.
2. Click Active Directory Role Mapping.
3. Hover over the Actions icon for the role and select Delete role mapping.
4. Click Yes, delete.

Settings

Use the Settings tab to configure the connection to the Credential Vault, enable email notifications, integrate the Enterprise Control Room with a Git repository, enable secure recording mode, and configure user authentication.

Bots

Secure recording mode ensures that sensitive data is not stored in the bots. When secure recording mode is enabled, the bots do not capture values of certain properties or store application images. This setting applies to all the users of the Enterprise Control Room.



Note: Secure recording mode only applies to bots that are created or edited after the mode is enabled.

Click Edit in the Bots tab to enable or disable secure recording mode.

Devices

When there is a new version of the Bot agent, all Bot agents are automatically updated.

IQ Bot

View the website address where IQ Bot is currently installed, if applicable. Click Edit to update the IQ Bot URL.

Email

All users have to confirm email accounts by clicking the confirmation link that they receive, set the password, and security questions before user can log in to the Automation Anywhere Enterprise Control Room. By default, email notifications are disabled. Mouse over the Edit icon to make changes.

[Edit email notifications](#) on page 1138

Git integration

Remote Git repository must support Git LFS (Large File Support). BotsBots are synced using standard Git push over HTTPS.

User authentication

Configure the [Control Room](#) to authenticate users through the database option or switch to a SAML identity provider (IDP).

[Set up SAML authentication](#) on page 388

Network settings

Ensures that access to the Cloud Control Room URL is not allowed from outside a specified list of designated IP addresses.

Configuration settings

Related tasks

[Set up SAML authentication](#) on page 388

Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).

[Edit email notifications](#) on page 1138

Edit details about the email server to use for dispatching email notifications.

Configure default device settings

Configure the device settings to automatically set a user's current device as the default device after the user logs in to the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Configure the default device setting for temporary or non-persistent devices so that such device users do not have to log in to the Enterprise Control Room to mark their device as a temporary device.

1. Navigate to Administration > Settings > Devices.
2. Edit the General settings.
3. To automatically set a logged-in user's device as the default device, verify that the Enabled option is selected.
The option is selected by default. You can change it to Disabled if you do not want to set a logged-in user's device as the default device.
4. Save the settings.

Change screen resolution for Bot Runner session

For multi-user devices, you can set the screen resolution of the Bot Runners for every bot deployment through the RDP in the Enterprise Control Room.

This task is performed by the user who wants to build and deploy bots. You must have the necessary rights and permissions to complete this task, and authorization to log in to the Enterprise Control Room as the licensed user.

The RDP session is created using the set screen resolution during bot deployment.

1. Navigate to Administration > Settings > Devices.
2. Edit the Resolution settings for a device session field.
3. Set the resolution by either selecting a predefined value from the Screen resolution drop-down list or by selecting Custom and entering the values you want.
4. Select the Do not allow devices to override resolution settings option.
5. Click Save.

Configure auto-delete temporary device settings

Configure your device settings to automatically delete a temporary device when the device is disconnected from the Enterprise Control Room after a certain time interval.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Settings > Devices.
2. Edit the Temporary devices - auto delete settings.
3. Use plus (+) or minus (-) to select the number of Days, Hours, or Minutes to wait before the temporary device should be deleted automatically.

The default time is 24 hours.

You can also manually delete the temporary device from the My devices page in the Enterprise Control Room.

4. Save the settings.

Configure threshold settings for user devices

Configure the CPU utilization and device memory threshold values to control the concurrent bot deployment on user devices based on resource utilization.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Based on the CPU utilization and device memory threshold values, you can determine whether to deploy bots on user devices. If the threshold value is the same or more than the value provided, the bots are not deployed on user devices.

The default values for CPU utilization and device memory are based on the following parameters:

- With a frequency of data collection at 10 seconds, the system collects 6 data points in 1 minute.
- With a time interval to upload data at 120 seconds, the system uploads 6 data points to the Enterprise Control Room at every 2 minutes.
- With a moving average time window at 2 minutes, the system uses the last 12 data points to calculate the average resource utilization.

1. Navigate to Administration > Settings > Devices.
2. Edit the Threshold settings for multi-user devices.
3. Optimize the behavior for concurrent sessions by choosing one of the following options:
 - Do not enable threshold settings
Use this option to deploy bots on single user devices.
 - Enable threshold settings to set the maximum values.
 - a. Enter the CPU threshold limit for new bot deployments on a device.
 - b. Enter the memory threshold limit for new bot deployments on a device.

Use this option to deploy on multi-user devices.

You can either enter the values or click the plus (+) or minus (-) signs to increase or decrease the limit.

4. Save the settings.

Configure auto-login settings

Configure auto-login settings in the Enterprise Control Room to either create user sessions or reuse existing user sessions to reduce the bot startup time.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Auto-login enables you to deploy a bot on Bot Creators, and attended or unattended Bot Runners after automatically logging on to a machine and restoring the machine to its original locked or logged off state after completing the deployment.

Configure auto-login settings to either create new user sessions or reuse existing sessions in the following scenarios:

- Before deploying a bot, some applications are kept running to accommodate a delay in the application launch.

- When Windows updates or Active Directory policy updates are pushed after a user logs in, changes in the automation environment might affect bot execution.
- Logging off from temporary or non-persistent devices stops bot execution.
- You can reuse existing user sessions when your company's IT policy prevents you from providing device user password for auto-login credentials.
- To bypass legal disclaimers on RDP-based deployments.

1. Navigate to Administration > Settings > Devices.
2. Edit the Auto login settings.
3. Choose how to run bots on user sessions by selecting one of the following options:
 - Always create a new session after the system logs out of an existing session.
Use this option for desktop deployments where it is possible to create user sessions on devices.
 - Reuse an existing session to choose to lock or unlock the session from the following:
 - An existing locked session
 - An existing unlocked session
 - A disconnected session

Use this option deployments on devices where it is not possible to create user sessions on devices.



Note: When you use this option, ensure user sessions exist. If there is no existing user session, bot deployments will fail.

- If a session exists, reuse or create a new session and if a session does not exist, create a new session and leave it unlocked for next user session after bots complete their run from the following:
 - A new session
 - An existing locked session
 - An existing unlocked session
 - A disconnected session
4. To allow a user to change the auto-login settings at the device level, go to Administration > My Devices and select Allow changes.
The Do not allow changes option disables the user-level auto-login settings for user sessions.
 5. Save the settings.

Related reference

[Devices](#) on page 1067

The device is a machine through which a user connects to the Enterprise Control Room to create or run bots. Manage devices that are registered to the Enterprise Control Room through the My devices page located in the DEVICES tab.

Network access

Ensures that access to the Cloud Control Room URL is not allowed from outside a specified list of designated IP addresses.

System administrators can restrict the access to the Cloud Control Room URL from only those IP addresses within the corporate network for more granular security. The Automation Anywhere Enterprise Control Room provides the ability to specify a list of IP addresses or IP subnets that are allowed for Cloud Control Room URL and API access. Therefore, the Enterprise Control Room and Bot agent device IP

addresses or subnets added to the list are allowed access to the Cloud Control Room URL. A2019 users with Control Room administrator privileges, such as to access Administration > Settings, can view, add, or edit this list.



Note: There is a limit of 25 independent entries in the access permitted table. An entry can be a single IP address or an IP subnet.

Related tasks

[Add access IP addresses](#) on page 1136

Add addresses one at a time, or as a range of addresses to limit the network access of other Enterprise Control Room and Bot agent users to the Control Room URL.

Add access IP addresses

Add addresses one at a time, or as a range of addresses to limit the network access of other Enterprise Control Room and Bot agent users to the Control Room URL.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

The Automation Anywhere Enterprise Control Room provides the ability to specify a list of IP addresses or IP subnets that are allowed for Cloud Control Room URL and API access.



Note: When using SAML for authentication, use the network access capabilities of the Identify provider to restrict access to specific allowed IP addresses.

Perform the following steps to add an IP address (or IP subnet) to the list of permitted network access addresses:

1. Log in to the Enterprise Control Room as the administrator.
2. Navigate to Administration > Settings > Network access.
3. Click Edit to add to or edit the IP addresses listed.



Note: There is a limit of 25 independent entries in the access permitted table. An entry can be a single IP address or an IP subnet.

4. Enter the IP address information:

Option	Description
Single IP address	Enter the necessary IP address in x.x.x.x format.
Range of IP addresses	Enter the address in x.x.x.x format and specify the subnet mask.

5. Enter the Name.
6. Optional: Enter a description.
7. Click Save changes.

Set up SAML authentication

Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.



Note: The SAML IDP side setup must be validated before configuring the Enterprise Control Room. See [Configure the Enterprise Control Room as a service provider](#).

To switch the Enterprise Control Room to a SAML-authenticated environment, follow these steps:

1. Navigate to Administration > Settings > User authentication.
2. Click Edit.
3. Select the Use SAML option.



Note: The Use Control Room database option is selected by default.

4. In the SAML metadata field, enter the data from your SAML IDP setup.

```
<saml2:AuthnStatement
  AuthnInstant="authenticated_instance" SessionIndex="index_value_required">
```

5. In the Unique Entity ID for Control Room (Service Provider) field, enter the entity ID.
6. In the Encrypt SAML Assertions field, select one of the following options:

Option
Do not encrypt
Encrypt

SAML assertions are not encrypted.
SAML assertions are encrypted.

7. Optional: Enter the Public key and Private key values.



Note: Enter keys only if you require encrypted SAML assertions.

8. Click Validate SAML Settings.

You are required to validate your SAML 2.0 settings before saving your changes.

When you click this option, you will be redirected to a SAML 2.0 service provider web page where you will be prompted to enter credentials and other data.

9. Enter a different username.

After validation is complete, you will be redirected back to this configuration page.

If the username already exists, an error appears.

10. Click Save changes.

Log back in to the system with your new credentials.

Related tasks

[Configure the Enterprise Control Room as a service provider](#)

Configure Credential Vault Connection mode

Credential Vault is a centralized location for securely storing credential information used by bots.

Configure the Connection mode to connect to the Credential Vault using a Master key.



Note: Provide this key every time you start or restart the Enterprise Control Room.

To configure settings for Credential Vault, select Express or Manual mode.

Express mode

Auto connect to the Credential Vault with the master key that is stored in the system during Enterprise Control Room configuration.

Manual mode

Use this to manually connect to the Credential Vault using the master key that was available during Enterprise Control Room configuration.

When switching modes, provide the Master Key in the field and click Save for the changes to take effect.



Tip: Restart the server machine (on which the Enterprise Control Room is installed) or services to allow changes to take effect.

All updates to the Credential VaultConnection mode are captured in the Audit Log.

If you are facing Credential Vault connection issues while accessing the Enterprise Control Room URL, see [CR fails to load with the Error Code cv.validation.secure.cv.locked \(A-People login required\)](#).

Related tasks

[Set up locker and assign credentials](#) on page 1100

Create a role, credentials, and locker to share related sensitive values with a group of users, so they can use those values to build or run bots.

Edit email notifications

Edit details about the email server to use for dispatching email notifications.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Specify details about the email server you want to use and the events when the email notification must be sent. To configure Email settings, perform these steps:

1. Navigate to Administration > Settings > Email.
2. Click Edit.
3. Select Send email notifications.
By default, the email notifications are disabled.
4. Specify the details of the server that you want to use to send email notifications.

Option

From this email address

Enter the email address that you want to use to send email notifications.

Email server host

Specify the email server that you want to use to send email notifications.

Email server port

Specify the email port that you want to use to send email notifications.

My server uses a secure connection (SSL/TLS)

Select the option if the server uses a secured connection.

My server requires authentication

Select the option if the server requires credentials for access.

Specify the Username and Password you want to use to access the server. Specify the credentials.



Important: The options to specify or modify the email server details are available only for the On-Premises deployment.

5. Select any or all of the following option to specify the events when an email notification must be sent:
 - User initiates Forgot Password process from Login screen
 - User information changes, to the user
 - A user is activated, deactivated or deleted, to the user
 - A Task Bot stops running because it is unsuccessful, to the user who started or scheduled it
 - A BLM package is exported or imported, to the user who performed BLM export or import
6. Click Save changes.

Integrating Enterprise Control Room with Git repositories

Git integration with the Enterprise Control Room ensures one-to-one mapping of the bots checked in to the public workspace of the Enterprise Control Room and the remote Git file structure. Git commits enable you to enforce security, compliance, and code standards, and ensures that an organization's established best practices can be applied to their bot development processes.

The Enterprise Control Room has Git Client that is connected to the Git repository that stores the file history of your public workspace. Each time a bot developer performs a bot check-in:

- The bot and the dependent files are checked in to the public workspace.
- The Enterprise Control Room creates a commit that contains all the contents of the particular check-in within the Git repository.
- The comment entered in the check-in process is used as the Git commit message and the user details are recorded as the author of the Git commit.
- The Bot definitions are stored as JSON files in the Git repository.

The Enterprise Control Room Git integration ensures one-to-one mapping of the bots checked in to the public workspace of the Enterprise Control Room and the remote Git file structure. Bot definitions are stored as JSON files in the Git repository.



Note: The Git repository must be configured to have write access only to the Enterprise Control Room and not to any other Git client.

Supported Git repositories

You can configure the Enterprise Control Room to replicate the built-in Git repository with the remote Git host, and synchronize information using Git push. The following sources are certified for Git integration with the Enterprise Control Room.

- GitHub
- BitBucket

Configure HTTPS (username and password authentication) between the Enterprise Control Room and the remote Git host. The Enterprise Control Room and remote Git host use standard Git push protocol over HTTPS to send or receive data.

Exposing the files to your remote Git host enables you to review the bot code and files using third-party comparisons and static code analysis tools to help enforce compliance and maintain security standards.

Configure a remote Git repository in Enterprise Control Room

Configure a remote Git repository in the Enterprise Control Room so that all the bot information that is stored in the Microsoft SQL Server is synchronized with the remote Git host. When you check in a bot, the local Git repository pushes the bot and its dependent files to the remote Git repository.

- In order to configure a remote Git repository in the Enterprise Control Room, ensure that you have the `AAE_Admin` role assigned to you.



Note: The Git repository must be configured to have write access only to the Enterprise Control Room and not to any other Git client.

- Based on your region, configure your network firewall to add outbound NAT gateway IP addresses to the allowed list.

[NAT IP addresses for Git integration](#) on page 1140



Note: The Git repository must be configured to have write access only to the Enterprise Control Room and not to any other Git client.

- In the Enterprise Control Room, navigate to Administration > Settings > Git Integration.
- In the Git Integration window, select Set up Git Integration.
- In the Credentials menu, perform these steps:
 - Enter your Git repository path in the User Name field in the following format:
`https://<username>@github.com/.../....git`
- Click Connect and Save.
The Enterprise Control Room connects to the remote Git repository.



Note: Use the Git host that you want to obtain the Git repository address.

- Enter your Git repository password or a Git token, generated using your Git client.
- Enter the same password or the Git token to confirm.
- Click Submit.

Remove Git integration configuration

If there is no longer a need to synchronize the bot information stored in your Enterprise Control Room with the remote Git host, you can remove or disable it.

Ensure that you have the `AAE_Admin` role assigned to you.

- Navigate to Administrators > Settings > Git Integration.
- In the Git Integration window, click Edit.
- Select Do not set up Git integration.
- Click Connect and Save.
This setting removes the remote Git configuration, and the Enterprise Control Room will no longer push the Git history to the remote Git host.

NAT IP addresses for Git integration

To ensure seamless connectivity of your Git instance with the Cloud Control Room, configure your network firewall to include Automation Anywhere outbound NAT gateway IP addresses to the allowed list.

Based on your region, add the following outbound NAT gateway IP addresses to the allowed list:

Region	NAT IP addresses
Asia-Pacific Australia	• 54.153.153.175 • 52.65.8.56 • 3.106.147.142
Asia-Pacific North East	• 18.177.157.130 • 18.176.174.19 • 3.114.196.205
European Union	• 108.128.188.103 • 63.34.200.237 • 52.30.160.238
India	• 3.7.60.137 • 3.6.235.61 • 13.232.116.48
Latin America	• 54.94.241.48 • 18.229.39.93 • 52.67.153.170
Middle East	• 15.185.153.52 • 15.185.181.122 • 157.175.32.98
Singapore	• 18.141.71.43 • 54.251.139.55 • 18.136.253.184
US East	• 50.16.245.134 • 35.174.84.76 • 3.210.114.16
US West	• 54.213.119.159 • 34.218.159.79 • 52.33.16.117

Restore bots from Git repository

If your database is deleted or corrupted, you can restore all your bots and the associated dependent files from the Git repository to your new database.

Ensure the following before you restore your bots from Git:

- You must have a backup of the bots on Git.

- You must have the AAE_Admin role assigned.
- The public workspace to which you are restoring your bots must be empty.

If the public workspace is not empty, the Restore from git option is not displayed.

- The Git restore process requires some downtime. When the restore process is running, the following public workspace operations are disabled:
 - Check-out
 - Clone
 - Run and schedule bots
 - Run bots with queue
 - Import and export bots
 - When the restore process is running, the check-in operation is not allowed from the private workspace. However, you can use the private workspace for the rest of the operations.
 - You cannot abort an ongoing restore process.
1. Connect your Enterprise Control Room to the remote Git repository.
 - a) In the Enterprise Control Room, navigate to the Administration > Settings > Git integration.
 - b) Enter your Git credentials to connect to the Git repository.
 2. Navigate to the Bots > My Bots > Public workspace.
 3. Click the Restore from Git option.
The Restore from Git dialog box appears and displays a warning that all the public repository operations are disabled during the Git restore process.
 4. Click Continue to proceed with the restore process.
The system starts restoring the bots and the dependent files from Git. This process takes some time. After the restore process is completed successfully, you are automatically returned to the My bots page. The bots and the dependent files are restored in your new database, maintaining the original structure of the dependent files.

If the Git restore process fails after restoring some bots, you are redirected to the public workspace with the following options. Choose the suitable option to complete the restore process:

Option	Action
Clear all bots	 Note: This will delete the public bots that were restored from the Git repository.
Try again	The Git restore process restarts from where it ended.

Usage statistics

Automation Anywhere collects usage statistics from Enterprise A2019 for product improvements.

Usage statistics provides information on where users might be facing issues with the product, the most used or least used features, and so on. This information helps in product improvement which in turn helps in improving the customer experience.

By default, the Usage statistics option is enabled in the Enterprise Control Room and usage data is collected. The data collected is stored in Automation Anywhere Enterprise and the service provider cloud. The collected data is typically generic information such as anonymized user details, customer name, and user navigation workflows such as menus the users access and clicks.

An administrator can disable the Usage statistics option by changing the settings in the Enterprise Control Room.



Note: The option can be disabled only for On-Premises deployments.

Disable usage statistics

An administrator can disable the Usage statistics option by changing the settings in the Enterprise Control Room.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Administration > Settings > General > Advanced settings.
2. Click Edit.
3. Select the Disabled option.
4. Click Save changes.

Set up instances for Cloud-enabled deployments

Manage trust relationship between the cloud-deployed Automation Anywhere Enterprise Cloud-enabled instance and the On-Premises applications.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

For Cloud-enabled deployment, the initial welcome email that you received from Automation Anywhere contains:

- URL to the Automation Anywhere Enterprise Cloud-enabled instance
- Provisioning token needed to establish trust connectivity with the Automation Anywhere Enterprise Cloud Control Room

Automation Anywhere deploys and configures an Automation Anywhere Enterprise A2019 Cloud instance for this Cloud-enabled deployment option. The customer then installs the On-Premises application within their infrastructure for storing and processing customer data. After this is complete, you install the On-Premises application within your infrastructure for storing and processing customer data.

1. Log in to the On-Premises Enterprise Control Room as the administrator.
2. Navigate to Administration > Settings > Cloud-enabled.
3. Provide the provisioning token to connect to the Enterprise Control Room.
4. Click Save changes.
5. Optional: Test the Cloud-enabled functionality.
Open a browser and enter the URL for the Cloud Control Room service instance. Click Enter to be redirected to the On-Premises Enterprise Control Room.

Generate registration key to install Bot agent in bulk

The Enterprise Control Room administrator can generate a registration key to install the Bot agent on multiple devices at a time in bulk.

Ensure you have set up the Microsoft Active Directory group policy to remotely install the Bot agent on multiple devices.

[Use Microsoft Active Directory Group Policy to remotely install software](#)

Before generating a new registration key, keep in mind that the new key invalidates the previous key and any entries or references to the previous key must be replaced with the new key value. Therefore, we recommend that you generate a new key only if the previous key is compromised.

Generate and copy the key for use in an installation script or as part of the Active Directory group policy to install the Bot agent on multiple devices at a time.

Generate a new registration key for installation:

1. Navigate to Administration > Settings.
2. Select the Bot agent bulk install option.
3. To launch the setting in edit mode, click the Edit option.
When you launch the setting for the first time, the option defaults to Generate a new key and the phrase `Key not set` appears.
4. To create a new registration key for installation, select the Generate a new key option.
5. To install the Bot agent using an installation script or through Active Directory group policy, click Copy to clipboard.
6. Save the settings.

Replace the registration key:

7. To launch the setting in edit mode, click the Edit option.
The option defaults to Keep current key.
8. To generate a new registration key, select the Generate a new key option.
9. Select Continue on the Current registration key replacement message box.
10. To use the key, click Copy to clipboard.
11. Save the updates.

Edit the Bot agent MSI file to remotely install the Bot agent on multiple devices.

Edit Bot agent installer MSI file

Edit the Bot agent MSI file to add the registration key and Enterprise Control Room URL to remotely install the Bot agent on multiple devices.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task.

Ensure the Windows 10 Software Development Kit including Orca and Enterprise Control Room are installed on your device. You can install Orca from `C:\Program Files (x86)\Windows Kits\10\bin\10.0.18362.0\x86\Orca-x86_en-us.msi`.

Also, set up the Microsoft Active Directory group policy to remotely install the Bot agent on multiple devices.

[Use Microsoft Active Directory Group Policy to remotely install software](#)

Edit the Bot agent `.msi` file to enable the Enterprise Control Room administrator to implement the auto-update Bot agent policy.

1. Navigate to `<application filepath>\crui\asset`

For example C:\Program Files\Automation Anywhere\Enterprise\cru\asset

2. Edit the AutomationAnywhereBotAgent.msi file using Orca tool.
3. Click the Property option.
4. Change the value for AA_CRTOKEN and AA_CRURL.
The AA_CRTOKEN uses the registration key and the AA_CRURL uses the Enterprise Control Room URL for which the registration key is generated.
5. Save your changes.

Licenses

The Automation Anywhere Enterprise Control Room provides an automated mechanism for tracking the use of licensed software.

Automation Anywhere Enterprise Control Room administrators view and manage user license entitlements on this page.

To add licenses for users, select the desired method of accessing the license by clicking Install license from server or Install license from file.

Installing additional licenses

Upload new licenses to the Automation Anywhere Enterprise Control Room to be distributed to users as required.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Designate the source of the license (server or filepath) to load into the Enterprise Control Room.

1. Navigate to Administration > Licenses.
2. Select Install license from server or Install license from file.

Choose installation source.

Option	Action
Install license from server	a. Supply the unique Control Room GUID. b. Click Install license from server.
Install license from file	a. Browse to and select the license. b. Click Install license from file.

Related reference

[User management](#) on page 1104

As a Cloud user with administrator permissions, you can create, view, edit, delete, and enable or disable a user. Creating users steps vary depending on whether the user is a non-Active Directory, Active Directory, or single sign-on (SSO) user from an IdP server.

[System roles](#) on page 1122

System roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted. Administrators assign the roles to users to enable them to access features and perform operations in the Enterprise Control Room.

[Settings](#) on page 1131

Use the Settings tab to configure the connection to the Credential Vault, enable email notifications, integrate the Enterprise Control Room with a Git repository, enable secure recording mode, and configure user authentication.

Stop and start Enterprise Control Room services on Linux

Review the instructions and service names to stop and restart Automation Anywhere Enterprise Control Room services on Linux.

Log in to your Automation Anywhere Enterprise Control Room server.

1. If you just finished installing A2019, use the following command to display the status of all Enterprise Control Room services:

```
sudo systemctl status control*
```

Browse through the output. If any of the services are not actively running, you can manually start the service with the following command (see the next step for specific service names):

```
sudo systemctl start <servicename>
```



Note: If more than one service is not running, you can use the script in the next step to start all the services.

For other Linux installation issues, contact Automation Anywhere support: [Open a support case \(A- People login required\)](#).

2. Optional: Create a script from the following code, such as `startallaae.sh`, to start all the Enterprise Control Room services.

The `sleep` commands allow each service to complete startup before the next service is started.



Note: `controlroomdiscoverybot.service` is only installed by default starting in Enterprise A2019 version 16.

```
echo Starting elasticsearch
sudo systemctl start controlroomelasticsearch.service
sleep 30
echo Starting botcompiler
sudo systemctl start controlroombotcompiler.service
sleep 30
echo Starting control room caching
sudo systemctl start controlroomcaching.service
sleep 30
echo Starting backend service
sudo systemctl start controlroombackend.service
sleep 30
echo Starting reverse proxy
sudo systemctl start controlroomreverseproxy.service
sleep 30
echo Starting messaging
sudo systemctl start controlroommessaging.service
sleep 30
echo Starting iq bot
sudo systemctl start controlroomiqbot.service
sleep 30
echo Starting discovery bot
```

```
sudo systemctl start controlroomdiscoverybot.service
sleep 30
```

Assign execute permission to the script and run it: `sudo ./startallaae.sh`

3. To stop a single service, use the following command: `sudo systemctl stop <servicename>`.

Optional: To stop all services for maintenance or other requirements, create a script, such as `stopallaae.sh`, to stop the Enterprise Control Room services.

```
sudo systemctl stop controlroommessaging.service
sudo systemctl stop controlroomreverseproxy.service
sudo systemctl stop controlroombackend.service
sudo systemctl stop controlroomcaching.service
sudo systemctl stop controlroombotcompiler.service
sudo systemctl stop controlroomelasticsearch.service
sudo systemctl stop controlroomiqbot.service
sudo systemctl stop controlroomdiscoverybot.service
```

Assign execute permissions to the script and run it: `sudo ./stopallaae.sh`

Enterprise Control Room log files

Various types of information about the Enterprise Control Room are captured in different log files. You can analyze these log files when the Enterprise Control Room or a bot encounters an error and identify the root cause for that error.

Overview

The log files capture information about the errors encountered by various components of the Enterprise Control Room such as the Bot Store, devices, and license. You can use the information in the log files to identify the root cause of an error and resolve that error.

Log file locations

The Enterprise Control Room log files are available at `C:\ProgramData\AutomationAnywhere\Logs` on the machine on which you have installed the Enterprise Control Room. The log files are named `WebCR_<COMPONENT-NAME>`, for example, `WebCR_BotStore`, `WebCR_Devices`, and `WebCR_License`.

You can refer the following log files for the Enterprise Control Room.

WebCR.log	Contains log entries related to the initialization of the Enterprise Control Room and messages, if any.
WebCR_UserManagement.log	Contains log entries related to the user management module.
WebCR_Ignite.log	Contains log entries related to the Apache Ignite or caching system.
WebCR_ServerRepository.log	Contains log entries of the server repository related functions.
WebCR_CredentialVault.log	Contains log entries of Credential Vault related function calls.

WebCR_Hibernate.log	Contains log entries related to the Hibernate system, ORM mapping and Query system, ActiveMQ messaging subsystem, and so on.

On the Bot Runner machine (on which the Bot agent is installed), the log files are available at C:\ProgramData\AutomationAnywhere\BotRunner\Logs. You can refer the following log files for the Bot Runner machine.

NodeManager.log	Contains log entry details of the interaction with the Bot agent and the log entry of every message sent to the Bot agent.
BotLauncher.log	Contains log entry details of the bots that are deployed on this machine.
TriggerListener.log	Contains log entry details of any triggering activities that occur in bots with triggers.

The corresponding configuration XML files are available at C:\Program Files\Automation Anywhere\Bot Agent\config.

Working with repositories, credentials and roles

Control room administrators configure repositories for Bot Creators to develop RPA bots. Administrators create roles, assign users, and grants permission to action packages used in creating bots.

This topic is intended for experienced Automation Anywhere Enterprise A2019 users.

Administrator tasks

Control room administrators setup repositories for Bot Creators to develop bots. For this process, administrators create users and assign these users specific roles, such as Bot Creators or Bot Runners. Bot Creators are granted access to specific RPA action packages to create, test, and run bots. Completed bots are transferred to the public repository for other users to deploy. The following is a breakdown of control room administrator related tasks to complete this process.

Set up your bot repository on page 1149	Administrators create repositories for Bot Creators to develop , test, and debug bots. After configuring the repository, the administrator creates the role for the Bot Creator.
Define the roles for your users on page 1149	Roles grant specific permissions to users, such as Bot Creators and Bot Runners.
Create your users and assign their licensed roles on page 1150	Create or otherwise edit the user information to assign the licensed role for accessing repositories, packages, and bot building tools and functionality.
Add packages to the Enterprise Control Room on page 1098	Administrators can add packages to the Enterprise Control Room for use by Bot Creators.
Set up lockers and credentials in Credential Vault on page 1152	The credentials assigned are typically those where the administrator is granting some internal, business-related access to a Bot Creator or Bot Runner for RPA development, for example to a Salesforce account.

Bot Creator task

Bot Creators often require access to protected data to automate a process. Each Bot Creator is given credentials governing the data they are permitted to access. The administrator creates the credential and assigns it to individual users by configuring specific roles for the Bot Creator to access those credentials. Bot Creators must add their own specific attributes to the credentials after they have been assigned by the administrator. See [Manage user credentials](#) on page 1153.

Related tasks

[Set up your bot repository](#) on page 1149

Administrators create repositories for Bot Creators to develop and build bots.

[Define the roles for your users](#) on page 1149

Roles grant specific permissions to users, such as Bot Creators and Bot Runners.

[Create your users and assign their licensed roles](#) on page 1150

Create a user and assign their specific license based role.

Set up your bot repository

Administrators create repositories for Bot Creators to develop and build bots.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Administrators create repositories for Bot Creators to develop , test, and debug bots. After configuring the repository, the administrator creates the role for the Bot Creator.

1. Log in to the Enterprise Control Room as the administrator.
2. Navigate to Bots > My Bots.
3. Click Create subfolder.
4. Provide the repository folder name and navigation path.
This repository folder is where the bots created by Bot Creators will be stored.
5. Click Create folder.

Create roles for users. Roles grant specific permissions to users, such as Bot Creators and Bot Runners.

Related tasks

[Define the roles for your users](#) on page 1149

Roles grant specific permissions to users, such as Bot Creators and Bot Runners.

[Create your users and assign their licensed roles](#) on page 1150

Create a user and assign their specific license based role.

[Add packages to the Enterprise Control Room](#) on page 1098

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

Define the roles for your users

Roles grant specific permissions to users, such as Bot Creators and Bot Runners.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Assign specific permissions to each user. Users shown as disabled cannot be selected if they have been deactivated by an Administrator.

1. Navigate to Administration > Roles.
2. Click Create role.
3. Enter the Name.
4. Optional: Enter a description.
5. Set the required permissions for the role associated with this repository.
6. Click Bots.
7. Select the desired repository folder and grant associating permissions.

Option	Action
Select all	Grant all associated permissions for the repository.
Run	Permission to run bots from the repository.
Check in	Permission to import bots to the repository.
Check out	Permission to export the bot from of the repository.
Delete from Public	Permission to permanently remove bots from the Public repository.

8. Optional: Click RUN AS.
This is where administrators select the specific device this role will have access to.
9. Click Create role.

Assign this role to the appropriate Bot Creator users.

Related tasks

[Create your users and assign their licensed roles](#) on page 1150

Create a user and assign their specific license based role.

[Add packages to the Enterprise Control Room](#) on page 1098

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

[Set up lockers and credentials in Credential Vault](#) on page 1152

Assign credentials to lockers for Bot Creators to access during the bot building process.

Create your users and assign their licensed roles

Create a user and assign their specific license based role.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

Create or otherwise edit the user information to assign the licensed role for accessing repositories, packages, and bot building tools and functionality.

1. Navigate to Administration > Users.
2. Click Create user.
3. Enter the Name.
4. Optional: Enter a description.
5. Enter the following user details:



Note: The number of characters allowed in First name and Last name is 50.

Field	Value
Enable User	Select for the user to be able to log in immediately.
Username	Enter a unique user name.
Description	Enter a description for the user.
First name	Enter the first name for the user.
Last name	Enter the last name for the user.
Password	Enter and confirm a password for the user. Ensure the password follows any necessary password policy.
Email	Enter and confirm the email address for the user. If SMTP is enabled, the user is sent an email to this address to confirm the account. All important Enterprise Control Room notifications will be sent to this email address.



Note: You can use the @ character to accommodate email usernames.

6. Select a Role from the list of Available roles.
7. Assign the device Bot Creator license to the user.
Enables user to create and run bots. Auto login enabled by default.
8. Click Create user.

Update the Bot Creator packages and grant permissions to this user to build, test, and run bots.

Related tasks

[Add packages to the Enterprise Control Room](#) on page 1098

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

[Set up lockers and credentials in Credential Vault](#) on page 1152

Assign credentials to lockers for Bot Creators to access during the bot building process.

Add packages to the Enterprise Control Room

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

1. Navigate to Bots > Packages.
2. Click Add package.
3. Click Browse.
4. Locate and select the package to add to the control room.
Packages are Java Archive (JAR) files that contain actions used to create bots.
5. Click Upload package.

6. On the Bots > Packages > Confirm package page, choose any of the following options:

Option	
Reject	Stops the upload process.
Accept, enable and set as default	Uploads and enables the selected package, and setting it to the default package for the Enterprise Control Room.
Accept and enable	Uploads and enables the package, but the package is not set as the default package. Bot Creators have to specifically select non-default packages to use them for creating bots.

Assign credentials to lockers for Bot Creators to access during the bot building process.

Related concepts

[Build and test a demo package and bot](#) on page 1020

This practical how to section demonstrates that creating, changing, and managing packages allow you to customize actions and efficiently manage packages for all Enterprise Control Room users.

Related tasks

[Manage Enterprise Control Room packages](#) on page 1098

Manage packages in the Enterprise Control Room by setting a package as default, disabling it, or deleting it.

[Set up lockers and credentials in Credential Vault](#) on page 1152

Assign credentials to lockers for Bot Creators to access during the bot building process.

Set up lockers and credentials in Credential Vault

Assign credentials to lockers for Bot Creators to access during the bot building process.

This task is performed by the Enterprise Control Room administrator. You must have the necessary rights and permissions to complete this task. Ensure you are logged in to the Enterprise Control Room as the administrator.

The following process leads you through the setup for a Credential Vault, creating credentials and lockers, as well as assigning those credentials to specific lockers.

The credentials assigned are typically those where the administrator is granting some internal, business-related access to a Bot Creator or Bot Runner for RPA development, for example to a Salesforce account.

1. Navigate to Bots > Credentials.
2. Click Create credential.
3. Enter the Credential name and a Description for the configured credential.
4. Enter the Attribute name and supply the Description for the attribute.
5. Select Input:

Input	Value
Standard	Enter the value. All users see the same credential value set by the credential owner.
User-provided	The value field is not available because the values are not preset during creation. Only users of the locker containing this credential can provide the value.

6. Set Security.
All masked values will be shown as asterisks.
7. Click Create credential.
8. Click the MY LOCKERS tab.
9. Click Create locker.
10. Enter the Name.
11. Optional: Enter a description.
12. Select the Credentials to add to the locker.
13. Add the Consumers.

Select one or more roles. Users with these roles have access to the locker. System-created roles are not shown in the Consumers list.

Type	Permission
Standard	Locker consumers can view the locker and all the credentials inside the locker. All consumers see the same credential value set by the credential owner.
User-provided	Locker consumers can input their information in user-provided credentials with user-provided attributes.

14. Click Create locker.

Related tasks

[Manage user credentials](#) on page 1153

Bot Creators and Bot Runners rely on credentials to access necessary data relevant to the bot building process.

Manage user credentials

Bot Creators and Bot Runners rely on credentials to access necessary data relevant to the bot building process.

This task is performed by the user who wants to build and deploy bots. You must have the necessary rights and permissions to complete this task, and authorization to log in to the Enterprise Control Room as the licensed user.

Bot Creators often require access to protected data to automate a process. Each Bot Creator is given credentials governing the data they are permitted to access.



Note: Administrators are required to have created the necessary roles and entitlements assigned to the user in order to update and use any granted permissions.

1. Navigate to BOTS > Credentials > My Credentials.
Select the credential to view and or manage.
2. Click Edit.

The configurable fields for the credential are displayed, based on the user granted permissions.

For example, a bot is built that requires the authentication username and password to log in to a specific URL. The user will create a custom credential for this operation by amending the credential governed by the administrator, adding the additional security details. This way, the Bot Creator can authorize only that protected data deemed necessary for the automation.

3. Click Save changes.

Bot Store

You can access Bot Store from the Enterprise Control Room. From Bot Store, you can download bots or packages to your Enterprise Control Room repository.

- Download bots to the Enterprise Control Room repository
Download bots or packages from Bot Store to your Enterprise Control Room repository.
- Submit bots to Bot Store
Submit bots or packages from the Enterprise Control Room repository to Bot Store.



Resources: To learn more, see [Automation Anywhere Bot Store Learning Trail \(A-People login required\)](#).

Related concepts

[Bot permissions for a role](#) on page 1119

Assign bot permissions when creating a role with the View my bots feature permission.

Access Bot Store from the Enterprise Control Room

As a Bot Store registered user, you can log in to Bot Store from the Enterprise Control Room.

You must have valid Bot Store credentials to access Bot Store from the Enterprise Control Room. If you do not have valid Bot Store credentials, you must register with Bot Store.

1. Log in to the Enterprise Control Room.
2. Click the Bot Store tab.
Bot Store opens in a separate window (<https://botstore.automationanywhere.com>).
3. Log in using your Bot Store credentials.
In the Enterprise Control Room, you can see My downloads under the Bot Store tab.
Watch the following video on how to find bots on Bot Store.

Related concepts

[Bot Store](#) on page 1154

You can access Bot Store from the Enterprise Control Room. From Bot Store, you can download bots or packages to your Enterprise Control Room repository.

Related tasks

[Submit bots or packages to Bot Store](#) on page 1155

You can submit bots or packages from the Enterprise Control Room to Bot Store. If your bot includes dependencies, submit all dependencies. Submit a demo bot that demonstrates the use of the package.

[Download bots or packages to the Enterprise Control Room](#) on page 1156

You can download bots or packages from the Bot Store to the Enterprise Control Room repository.

Submit bots or packages to Bot Store

You can submit bots or packages from the Enterprise Control Room to Bot Store. If your bot includes dependencies, submit all dependencies. Submit a demo bot that demonstrates the use of the package.

You must have a system-created AAE_Bot Store Publisher role in order to submit bots or packages to Bot Store. See [System roles](#) on page 1122.

1. Download the A2019 Bot Store Bot template from GitHub: [A2019 Bot Store Bot Template](#).
2. Log in to the Enterprise Control Room.
3. Log in to Bot Store using the Bot Store credentials.
4. Click BOTS > My bots.
5. Click Public workspace and select the Bot Store folder.
6. In the My bots page, move your mouse over the Action toolbar and click Submit to Bot Store.
 - a) In the Submit to Bot Store page, review the dependencies that will be bundled with your bot (including a parent bot) and make changes as required. In addition, ensure that the bot and all dependent bots and files are in the same folder to submit to Bot Store.
 - b) Click Next to review the Bundled packages to ensure all packages are included with your submission.
 - c) If the bot you want to submit and the bundled package look complete, click Submit.
When choosing a name for your bot or package, ensure it is unique and descriptive so it is easily searchable on Bot Store.
Alternatively, click Back to go back.
When you submit your files, the system displays the following message: `<bot/package name> submission is in progress. Go to Bot Store > My Submissions to complete your submission form. You will receive a confirmation email when the submission is completed.`
 - d) Click Take me to Bot Store to complete your submission form in Bot Store.

When you resubmit files to Bot Store, it overwrites the previously submitted files, which are in a **Draft** status.

- It can takes three to five business days for review and approval of your bot or package.
- For any questions on bot and package submissions, contact [Contact Bot Store Support](#) or select the Have questions about submitting a bot option on Bot Store pages.

Watch the following video on how to create and submit bots to Bot Store.

Related concepts

[Bot Store](#) on page 1154

You can access Bot Store from the Enterprise Control Room. From Bot Store, you can download bots or packages to your Enterprise Control Room repository.

Related tasks

[Access Bot Store from the Enterprise Control Room](#) on page 1154

As a Bot Store registered user, you can log in to Bot Store from the Enterprise Control Room.

[Download bots or packages to the Enterprise Control Room](#) on page 1156

You can download bots or packages from the Bot Store to the Enterprise Control Room repository.

Download bots or packages to the Enterprise Control Room

You can download bots or packages from the Bot Store to the Enterprise Control Room repository.

You must have a system-created AAE_Bot Developer role in order to download bots or packages to your Enterprise Control Room repository. See [System roles](#) on page 1122.

1. Log in to the Enterprise Control Room.
2. Log in to the Bot Store using the Bot Store credentials.
3. Click Bot Store > My downloads.
4. In My downloads page, move your mouse over the Action toolbar and click Add to My bots.
The following message appears: **If you have any files already installed in private workspace, they will be overwritten.**
5. Select Yes, continue to overwrite an existing file and continue with the installation, or select No, cancel to cancel your download.
In My downloads page, the installation status of the selected file changes to **Installed**.
6. Verify the downloaded bots in the Bot Store folder of the private workspace.
Custom packages downloaded from the Bot Store are available from the Packages repository. Or, you can access them from the Bot Editor > Action Palette.
7. Verify that the downloaded packages have been enabled in the Packages repository. If the packages are not enabled, then go to individual packages and enable them.

Watch the following video on how to download a Bot Store bot to your Enterprise Control Room.

Related concepts

[Bot Store](#) on page 1154

You can access Bot Store from the Enterprise Control Room. From Bot Store, you can download bots or packages to your Enterprise Control Room repository.

Related tasks

[Access Bot Store from the Enterprise Control Room](#) on page 1154

As a Bot Store registered user, you can log in to Bot Store from the Enterprise Control Room.

[Submit bots or packages to Bot Store](#) on page 1155

You can submit bots or packages from the Enterprise Control Room to Bot Store. If your bot includes dependencies, submit all dependencies. Submit a demo bot that demonstrates the use of the package.

Getting started with Private Bot Store

Use Private Bot Store to view and submit bots and bot use cases within your company. Use admin tools to review and publish bots and manage users.

The following is a high-level overview of how to get started with Private Bot Store:

1. The Private Bot Store support team creates admin users for your company.
2. Optionally, the support team helps you set up SAML-based SSO or Active Directory Federation Services (ADFS) integration.
3. Admin users grant other users Private Bot Store access and permissions. (It is automated if you use SAML-based SSO or ADFS).
4. Users create bot listings and submit them for approval.
5. Admin users can approve or reject the submitted bots.

- If approved, the bot listing is published and is available on Private Bot Store for other users within the organization to view.
 - If rejected, the bot author receives feedback on what has to be updated. The bot author updates the bot and resubmits it.
6. Other employees within the company access the published bot listings and use them in their automation tasks.

Related concepts

[Private Bot Store](#) on page 252

Private Bot Store is a secure internal bot marketplace for a company to post and share details and documentation for all internally developed bots. Employees can easily discover internal bots and commands to reuse in addition to all of the bots from the Automation Anywhere Bot Store vendors.

Set up A-People user access to Private Bot Store

A-People user access and management is included out-of-the-box with Private Bot Store. Within Private Bot Store, your company admin can manage users. Other users with granted permissions can access Private Bot Store with the same credentials they use for public Bot Store and other Automation Anywhere sites.

- Set up A-People user access
After your first admin users get access to Private Bot Store, they can add additional users. Any Private Bot Store user with admin access can manage users from the Private Bot Store - User Access Settings page.
- Add new users individually or in bulk
 - a) Navigate to User Access Settings.
 - b) Click Add Users.
 - c) Enter the email addresses for the users you want to add.
Invited users will receive an invitation email with instructions to set up their account.
- Change user permission level
Only admin users can modify permission levels by selecting the correct level in the Access panel.
- Delete users
Select Delete in the Actions panel.

Related tasks

[Submit and approve bots using Private Bot Store](#) on page 1158

Use Private Bot Store to submit, review, and approve detailed bot listings for all of the bots your team has built.

Set up SAML user access to Private Bot Store

Use SAML-based single sign-on (SSO) or Active Directory access to ensure that your Private Bot Store user access is updated automatically when users join or leave your company. Users can log in to Private Bot Store using the same credentials they use for other applications.

- Set up SSO or Active Directory Federation Services (ADFS) user access
The Private Bot Store support team will help you set up SSO or Active Directory user access.
- Provide details about Private Bot Store in your identity provider (IdP) settings.

- Provide the Private Bot Store support team some information about your system.

The Private Bot Store support team will verify the information and complete the integration.

After the integration is completed, your Private Bot Store user access will be managed automatically by your SSO or ADFS user access.

- Change user permission level

Admin users can change a user's permission level by navigating to the Private Bot Store Settings page and updating user permissions.

Admins can only modify a user permission level if a user is an active Private Bot Store user.

Related tasks

[Submit and approve bots using Private Bot Store](#) on page 1158

Use Private Bot Store to submit, review, and approve detailed bot listings for all of the bots your team has built.

Submit and approve bots using Private Bot Store

Use Private Bot Store to submit, review, and approve detailed bot listings for all of the bots your team has built.

- Submit internal bots:

To submit a new bot:

- a) From Private Bot Store, click My Submissions.
 - b) Click Add New Bot.
 - c) Enter all the required fields, such as bot description, benefits, and requirements.
 - d) Review the documentation examples for each field and follow the suggested guidelines.
 - e) Click Submit or click Save to save the bot before submitting it.
- After you submit your bot, your Private Bot Store admin team receives an email to review the bot.
- Your bot will be published or it might be send back for an update and resubmission.

- Review internal bot submissions

Private Bot Store admin users approve or reject bot submissions before they can be published.

- a) As an admin user, navigate to Private Bot Store and click All Submissions.
- b) Click Review Bot to review each submitted bot.
- c) Approve or reject the submitted bot:
 - Approve and publish a bot: On the Review Bot page, click Approve to publish the bot.
 - Reject the bot and request updates: On the Review Bot page, click Reject to reject the bot and send feedback to the bot submitter with instructions for updates.

Submit and manage bot ideas using Private Bot Store

Use Private Bot Store to submit, manage, and prioritize bot ideas for your development requirements.

- Submit bot ideas
 - a) From Private Bot Store, click Suggest Bot Idea.

- b) Fill in all the fields about your bot idea, with as much detail as possible.
 - c) Click Submit.
After you submit the bot idea, your admin team will review and prioritize it. The admin team might contact you for more information about your bot idea.
 - Manage bot ideas
Private Bot Store admin users can manage and prioritize bot ideas.
 - a) As an admin user, navigate to Private Bot Store and click Manage Bot Ideas.
 - b) Click Review to review each submitted bot idea.
 - c) Edit any of the fields as required.
 - d) Select a Bot Priority level for the bot idea.
 - e) Click Save.
 - f) Click the Mail icon to contact the bot idea submitter to request additional details.
- Watch the following video on how to submit a bot idea to Bot Store.

Custom filter management in Private Bot Store

Create your own filters and tags to organize your automations in Private Bot Store using the custom filter management page.

Custom filter management enables you to perform the following activities:

- Rename any of the default filters such as Applications and Departments, and tags (specific categories) such as Excel and Finance.
- Add up to six of your own custom filters.
- Add your own custom tags, with up to three nested layers of tags, for example, 2021 > Q1 > January.
- Select which filters you want to appear first in your Private Bot Store navigation.
- Select up to five top tags to appear first under their filter.

The custom filters are displayed throughout Private Bot Store, including:

- In the top navigation, filters on the left, and search results.
- On the listing submission form, where bot builders can select custom tags for their bots.
- On bot detail pages, where users can see how each bots is categorized.

Edit filters

1. You must have an admin user permission to access the Manage Filters page in Private Bot Store.
2. Navigate to Private Bot Store > Manage Filters > Admin Tools > Manage Filters.
3. Edit the default filters to match your company terminology.

Whenever possible, use default filter names, such as Departments, rather than creating your own filters. As a result, all the existing bots are already tagged and you do not have to tag them again.

4. Under Actions, click the Rename Filter action (pencil icon) to rename the filter.
5. Click Add Filter to add a new filter. Enter the name for the new filter.

You can add up to six custom filters.

6. Select a filter and click Reorder entry on the left and place the filter into your desired order.
The filter order is reflected in the Private Bot Store navigation and the filter panel.
7. Click the delete (X) action in the right column to delete any custom filter.
You cannot delete default filters.

Edit tags

1. Navigate Admin Tools > Manage Filters > Actions select a filter and click the tree icon Add and Edit Tags action.
2. Select a tag and click the tree icon to Add Child Tag within a tag. Enter a new child tag name.
You can add up to three layers of nested tags.
3. Click the Rename Tag action to rename any tag.
For the default tags, the original Tag Name continues to appear in the Default Name column for your reference.
4. Select up to five Top Tag in the left column to display those tags at the top of the list within each filter.
Use this for your company most-used applications or other important bot categories. Other than the selected Top Tag, tags are displayed in alphabetical order.
5. Click the delete (X) action to delete any custom tag.
You cannot delete the default tags.

Bot Lifecycle Management

The Automation Anywhere Bot Lifecycle Management (BLM) feature enables you to move a bot from one environment to another. For example, you can move a bot from the development or testing environment to the production environment.

Overview

The BLM feature easily integrates with the DevOps workflow that supports separate development, testing, acceptance, and production environments and it enables you to move bots along with their dashboards from one environment to another.

You can use the feature to move bots within different environments and help you prevent any failure or disruption of data. You have to export and then import a bot to move it from one environment to another. You can also bundle all the dependencies of a bot when transitioning it through the different environments.

Import 11.x bots in Enterprise A2019 for migration

The BLM import feature also support to import your 11.x bots from 11.x Enterprise Control Room instance to Enterprise A2019. This enables you to consolidate the 11.x bots from multiple Enterprise Control Room repository in a single Enterprise A2019 repository. You can migrate the imported 11.x bots in Enterprise A2019 using the migration wizard.

Permissions required to move bots

To export from the Enterprise Control Room, you must have the following permissions:

- Export bot and View packages feature permissions
- Check in or Check out folder permissions

To import a bot to the Enterprise Control Room, you must have the following permissions:

- Import bot and Manage package feature permissions
- Check in folder permission

Moving a bot

To move a bot from one environment to another, follow these steps:

1. Export the bot from the Enterprise Control Room in the source environment.
2. Import the bot into the Enterprise Control Room in the destination environment.

Related concepts

[Bot Lifecycle Management API](#) on page 1198

Use the Bot Lifecycle Management API to export and import bots with dependent files and command packages for comprehensive automation lifecycle management. Users can export bots from public workspace and import to a private workspace in another Enterprise Control Room and check into a public workspace.

Guidelines for exporting and importing bots

Review the guidelines before you export or import bots.

Guidelines for exporting bots

- Export the action packages along with the bot because the packages in the target Enterprise Control Room to which you are importing the bot might be different.
- Export the bots folder-wise by moving all the bots from one folder first before moving to the next folder. So do not select the bots from the different folders
- Ensure your SMTP (email) server is integrated with the Enterprise Control Room so that you can receive a link to the exported package through email.

[Configuring email server](#) on page 589

- Ensure that the source and target Control Rooms have the same set of global values.
- Ensure that the source and target Control Rooms have the same set of lockers and credentials that are referred in the bots.

Guidelines for importing bots

- Recommended: When importing bot from the Bots > My bots page, use the Skip the bot or file (don't import it) option because you might want to check the bot first before overwriting it with the imported bot.
- Recommended:: First import the bots to your private repository (if you are a bot developer), verify the bot, and then check it in to the public workspace.
- The bot directory path is case-sensitive, so ensure that the export and import paths use the same letter case in the Enterprise Control Room.

Export bots

You can export a bot from one Enterprise Control Room to another.

- Only bots in the public workspace can be exported. To export bots, first check these bots into the public workspace before exporting them to the private workspace.
- Ensure that you have the `View package` permissions.
- Ensure that you have the `View content` rights at the folder level from which you want to export the bots.
- Ensure that the version of Enterprise Control Room and packages in the source and target Enterprise Control Room are same for export as well as import.
-

Review the guidelines before you export bots.

[Guidelines for exporting and importing bots](#) on page 1161



Note: The Enterprise Control Room maintains a maximum of 10 GB of historical export files in the download directory. Files are deleted on a first-in/first-out basis in order to maintain this threshold.

1. Navigate to BOTS > My bots.
2. From the public directory, select the bot you want to export. Click the Export bots icon.
The selected bot as well as the required dependencies are displayed in the Bots and Files window.
3. Click Next.
The bot and its dependencies are ready for export and displayed in the Review Dependencies window.
4. Click Next.
All related packages are displayed.
5. Select the necessary packages associated with the bot to export.
Select Exclude bot packages to remove all packages from the export.
6. Click Export bots and files.
All the selected bots are exported into a zip file.



Note: If you have analytics bots in your Enterprise Control Room, all the Bot Insight dashboards (default, custom, and published) associated with the bots are also exported into the zip file.

If you have configured SMTP, an email is sent that contains a link to the zip file of the exported package.

If you have not configured SMTP, perform the following steps to access the link to the zip file of the exported package:

- a) Navigate to ACTIVITY > Historical.
- b) Search and view the historical activity of the exported package.
- c) Click Download exported zip file.

A link to download the zip file is displayed.

7. Use the link to download the zip file and save it to a location for importing it to another Enterprise Control Room.

Import the bots into an Enterprise Control Room.

Related tasks

[Import bots](#) on page 1163

You can import bots with their dependencies from one Enterprise Control Room to another. The source environment can be either an Enterprise A2019 Control Room or a 11.x Control Room instance.

[Export files using API](#) on page 1199

You can export bots with their dependent files using the Export API.

Related reference

[System roles](#) on page 1122

System roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted. Administrators assign the roles to users to enable them to access features and perform operations in the Enterprise Control Room.

Import bots

You can import bots with their dependencies from one Enterprise Control Room to another. The source environment can be either an Enterprise A2019 Control Room or a 11.x Control Room instance.

- Ensure that the following rights are enabled to import bots:
 - Import bots permission
 - Create folder permission, if it is required
 - Check-in to public workspace permission if you are importing to the public workspace
- Ensure that the version of Enterprise Control Room and packages in the source and target Enterprise Control Room are same for export as well as import.
- You must have a Bot Creator license to import bots either into the private workspace or public workspace.

You can import bots into the public workspace if you have the required permissions, regardless of your license.

- To import the 11.x bots into your Enterprise A2019 Control Room, consider the following additional requirements:
 - You must have the required `aapkg` package that you created using the BLM export feature in the 11.x Enterprise Control Room instance.
 - The `aapkg` package must be present in the same Enterprise A2019 machine where you want to import the 11.x bots.
 - You can import the password protected `aapkg` packages using the BLM Import API only.

[Import files using API](#) on page 1200

- Review the guidelines before you import bots.

[Guidelines for exporting and importing bots](#) on page 1161

- To import bots from one Enterprise Control Room to another, use the exported zip file (or aapkg file, in case of 11.x bots). If the SMTP is configured, you will receive a link to download the zip or aapkg file on your configured email address. If SMTP is not configured, you can access the download link by navigating to Activity > Historical page.

1. Navigate to BOTS > My bots.

2. Click Import bots.

3. Browse and select the required zip file or aapkg file based on your source environment:

Source environment	Action
Enterprise A2019 bots	Select the required zip file.
11.x bots	Select the required aapkg file.

4. Select the private workspace or public workspace based on your following source environment:

Source environment	Action
Enterprise A2019 bots	You can select either the private or public workspace as required. If you have analytics bots in your source A2019 environment, then all the associated Bot Insight dashboards are also imported based on the following selection: - If you select the private workspace, you can view only default and custom dashboards. To view published dashboards, you must check in the bots to the public workspace. - If you select the public workspace, you can view only published dashboards. To view default and custom dashboards, you must check out the bots to the private workspace.
11.x bots	Select the public workspace. This selection enables you to migrate 11.x bots to the Enterprise A2019 environment later during migration.

5. If some of the files that are being imported from the package are already available in your Enterprise Control Room, choose one of the following options:

- Skip the bot or file (don't import it)
- Overwrite the bot or file with the imported one

6. Click the Import bots option.

7. After the import is complete, based on your source environment, navigate to the corresponding repository to find and use the imported bot:

Source environment	Action
Enterprise A2019 bots	Navigate to the corresponding workspace (private or public, based on your selection in Step 4).

Source environment	Action
11.x bots	Navigate to the public workspace in the Bots > My Tasks folder or Bots > My Metabots folder.  Note: 11.x bots are imported in .atmx and .mbot format. Use the migration wizard to convert the 11.x bots files to the .bot format, which is supported in Enterprise A2019. Migrate Enterprise bots on page 495

Related tasks

[Export bots](#) on page 1162

You can export a bot from one Enterprise Control Room to another.

[Import files using API](#) on page 1200

You can import bots with their dependent files using the Import API.

Related reference

[System roles](#) on page 1122

System roles are preconfigured with the permissions necessary to perform the tasks within the scope of that role. They cannot be modified or deleted. Administrators assign the roles to users to enable them to access features and perform operations in the Enterprise Control Room.

Enterprise Control Room APIs

The Automation Anywhere Enterprise Control Room provides various APIs that allow you to customize the way that you (and your bots) interact with Automation Anywhere. Users can perform tasks such as manage bot deployments, create and manage credentials in the Credential Vault, create and manage user accounts and roles, and create and manage queues.

Getting started with Enterprise Control Room APIs

The Enterprise Control Room APIs use the standard HTTP methods GET, POST, PUT, and DELETE and standard HTTP codes for responses. See [API response codes](#) on page 1314. All requests must include an X-Authorization header with the JSON authentication token. See [Authentication API](#) on page 1171.

API requests are made to a live Enterprise Control Room, not a test environment. When you make API requests through Swagger or a REST client, the requests can impact your users, bots, and other resources.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Watch the following video to learn how to test Enterprise Control Room APIs in Swagger and Postman:

This is the Postman collection mentioned in the video: <https://www.postman.com/collections/bb5cd3541d29e192cd43>

API tutorials

The following tutorials demonstrate how to combine endpoints to perform a task programmatically. Each tutorial includes code examples and describes the prerequisites necessary to use the endpoint.

The tutorials assume that you have an Enterprise Control Room configured with users, roles, and bots. If you have not already done so, [Configure the Enterprise Control Room](#) on page 1166.

- [Configure the Credential Vault for your organization](#) on page 1202
As a Locker admin, configure a locker and a credential, then assign the credential to the locker.
- [Create workload automation](#) on page 1290
Combine the endpoints from the Workload Management API to programmatically create WLM queues and run bots.
- [Deploy a bot](#) on page 1212
Deploy a bot to an unattended Bot Runner.
- [Create an automation schedule](#) on page 1179
Schedule a bot to run on an unattended Bot Runner either one time or on a recurring basis.

Configure the Enterprise Control Room

Before you start creating workflows for bot deployment and workload management (WLM) using Enterprise Control Room APIs, ensure you complete specific prerequisites and steps in the Enterprise Control Room.

Ensure you have following licenses and permissions:

- One or more Bot Creator and unattended Bot Runner licenses.
- Enterprise Control Room admin credentials to view, create, and configure users, roles, and device pools.
- The Create device pools feature permission or the AAE_Pool Admin role must be assigned to you.

Follow these steps to configure your Enterprise Control Room with users, roles, and bots.

1. Log in to the Enterprise Control Room as an admin.
2. Create an Enterprise Control Room user.
Ensure that the user is assigned the AAE_BASIC role.
[Create a user](#) on page 1106
3. Create a custom role to map the users you created to Bot Runners and Bot folders.
 - a) In the Features tab, ensure you select these permissions: View my Scheduled Bots, Schedule my bots to run, Run my Bots, View my Bots, and Generate my API Key.
 - b) In the Bots tab, expand the Bots folder and select the root folder or subfolders you want to provide access for use. Ensure you select these permissions: Run and schedule and View content.
 - c) In the Run as tab, select one or more Bot Runners from the list of Available bot runners.
 - d) In the Users tab, select the new user created in Step 1 to assign the custom role to this new user.
4. Create a new device pool.
In the Consumers tab, ensure you select the custom role you created in Step 3.
[Create device pools](#) on page 1074

5. Log in to the Enterprise Control Room as a Bot Creator and create bots to automate routine business tasks.

[Build a Go be Great bot](#) on page 886

Ensure you check in the bots in the Bot folder or folders selected when creating the custom role (Step 3). [Check in a bot](#) on page 857

Audit API

Use the Audit API to request audit data for a given input combination of date filter, sorting mechanism, and pagination.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- Users with the AAE_Admin role or users with the View everyone audit log actions permission can view audit logs for the Enterprise Control Room.

1. Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
2. Apply filters to perform basic conditional queries and pagination control for processing web pages. There are three basic features related to filtering: filtering conditions, sorting columns, and pagination parameters.

[Filters in an API request body](#) on page 1308

3. Use the POST method and endpoint URL: <your_control_room_url>/v1/audit/messages/list.

The following example requests unsuccessful login attempts for the month of December, 2019.

Request body:

```
{
  "sort": [
    {
      "field": "createdOn",
      "direction": "desc"
    }
  ],
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "gt",
        "field": "createdOn",
        "value": "2019-12-01T00:00:00.001Z"
      },
      {
        "operator": "lt",
        "field": "createdOn",
        "value": "2019-12-31T23:59:59.999Z"
      },
      {
        "operator": "eq",
        "field": "status",
        "value": "Unsuccessful"
      }
    ]
  }
}
```

```

    {
      "operator": "substring",
      "field": "activityType",
      "value": "LOGIN"
    },
    {
      "operator": "substring",
      "field": "userName",
      "value": "joe.typical@myemiil.com"
    }
  ]
},
"fields": [],
"page": {
  "length": "1000",
  "offset": "0"
}
}

```

4. Send the request.

The response for this example returns data for the date filter, sorting, and pagination. If no filtering is used in the request, a successful response returns all pages for the specified Enterprise Control Room.

Response body:

```

{
  "page": {
    "offset": 0,
    "total": 731064850,
    "totalFilter": 9
  },
  "list": [
    {
      "id": "XlHj6G4BFXSp00ji5B7S",
      "eventDescription": "User does not exist in Control Room.",
      "activityType": "LOGIN",
      "environmentName": "",
      "hostName": "12.xxx.xx.x",
      "userName": "joe.typical@myemiil.com",
      "status": "Unsuccessful",
      "source": "Control Room",
      "objectName": "N/A",
      "detail": "",
      "createdOn": "2019-12-09T04:21:19Z",
      "requestId": "04965c2e-82e0-4ce4-a88d-bebe1dc3a2a8",
      "createdBy": "0"
    },
    {
      "id": "g1Hj6G4BFXSp00ji2Rwx",
      "eventDescription": "User does not exist in Control Room.",
      "activityType": "LOGIN",
      "environmentName": "",
      "hostName": "12.xxx.xx.x",
      "userName": "joe.typical@myemiil.com",
      "status": "Unsuccessful",
      "source": "Control Room",
      "objectName": "N/A",
      "detail": "",
      "createdOn": "2019-12-09T04:21:16Z",
      "requestId": "61672553-477d-4012-ab47-2a27f6553c4e",
      "createdBy": "0"
    }
  ],
}

```

```

.....
{
  "id": "ETyk6G4BFXSp00jiaJjt",
  "eventDescription": "User does not exist in Control Room.",
  "activityType": "LOGIN",
  "environmentName": "",
  "hostName": "12.xxx.xx.x",
  "userName": "joe.typical@myemiil.com",
  "status": "Unsuccessful",
  "source": "Control Room",
  "objectName": "N/A",
  "detail": "",
  "createdOn": "2019-12-09T03:11:58Z",
  "requestId": "ebeb01de-1f81-4a7c-8978-405806e146bd",
  "createdBy": "0"
}
]
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Related concepts

[Example of createdOndate and userName filters in Audit API](#) on page 1169

Create a filter that retrieves audit log entries for a specified date range for a user with a specific value in the userName field.

Example of createdOndate and userName filters in Audit API

Create a filter that retrieves audit log entries for a specified date range for a user with a specific value in the userName field.

Use filtering to help narrow your results. The following example identifies unsuccessful login attempts for users with the value "john, doe" in the userName field from December 1, 2020 through December 31, 2020.

Request body:

```

{
  "sort": [
    {
      "field": "createdOn",
      "direction": "desc"
    }
  ],
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "gt",
        "field": "createdOn",
        "value": "2020-12-01T00:00:00.001Z"
      },
      {
        "operator": "lt",
        "field": "createdOn",
        "value": "2020-12-31T23:59:59.999Z"
      },
      {
        "operator": "eq",

```

```

        "field": "status",
        "value": "Unsuccessful"
      },
      {
        "operator": "substring",
        "field": "activityType",
        "value": "LOGIN"
      },
      {
        "operator": "substring",
        "field": "userName",
        "value": "john,doe"
      }
    ]
  },
  "page": {
    "length": "1000",
    "offset": "0"
  }
}

```

This request identified three audit log entries out of 731,148,339 entries from this Enterprise Control Room log entries.

Response body:

```

{
  "page": {
    "offset": 0,
    "total": 731148339,
    "totalFilter": 3
  },
  "list": [
    {
      "id": "kLjB8G4BFXSp00jioMk1",
      "eventDescription": "User does not exist in Control Room.",
      "activityType": "LOGIN",
      "environmentName": "",
      "hostName": "50.xxx.xxx.xx",
      "userName": "john,doe@mycompany.com",
      "status": "Unsuccessful",
      "source": "Control Room",
      "objectName": "N/A",
      "detail": "",
      "createdOn": "2020-12-10T17:00:52Z",
      "requestId": "3c0f8e47-5820-43e8-b2b3-83b2f1cb86c9",
      "createdBy": "0"
    },
    {
      "id": "SLjB8G4BFXSp00jikl5i",
      "eventDescription": "User does not exist in Control Room.",
      "activityType": "LOGIN",
      "environmentName": "",
      "hostName": "50.xxx.xxx.xx",
      "userName": "john,doe@mycompany.com",
      "status": "Unsuccessful",
      "source": "Control Room",
      "objectName": "N/A",
      "detail": "",
      "createdOn": "2020-12-10T17:00:48Z",
      "requestId": "eba3e5a7-0034-440a-a786-110a84fea7c9",
      "createdBy": "0"
    }
  ]
}

```

```
{
  "id": "7bjB8G4BFXSp0OjicEGO",
  "eventDescription": "User does not exist in Control Room.",
  "activityType": "LOGIN",
  "environmentName": "",
  "hostName": "50.xxx.xxx.xx",
  "userName": "john,doe",
  "status": "Unsuccessful",
  "source": "Control Room",
  "objectName": "N/A",
  "detail": "",
  "createdOn": "2020-12-10T17:00:39Z",
  "requestId": "64184450-aad5-4024-bcf5-491fb5276d0c",
  "createdBy": "0"
}
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Related concepts

[Filters in an API request body](#) on page 1308

Filtering provides basic conditional queries and page control for processing API requests. There are three basic components to filtering: conditions, sorting, and pagination parameters.

Related tasks

[Audit API](#) on page 1167

Use the Audit API to request audit data for a given input combination of date filter, sorting mechanism, and pagination.

Authentication API

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Set up authentication or authorization for your application

1. Generate a token with one of the following endpoints:



Note: Tokens have a default timeout of 20 minutes.

- [Authenticate with username and password API](#) on page 1172

If you are trying out the Enterprise Control Room APIs in Swagger or another REST client, use this authentication method.

- [Authenticate with username and apiKey API](#) on page 1174

Use this authentication method to generate the token without the need for the user's password, such as for organizations that use single sign-on (SSO).

- Simple and Protected Negotiation GSSAPI Mechanism (SPNEGO)

In an Enterprise Control Room configured with SPNEGO, you can use the following URL to generate a token: `https://<your_control_room_url>/v1/authentication/SPNEGO`

- ## Authenticate with username and password API

Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

 Note: For an Enterprise Control Room that is deployed on Cloud and has SAML authentication enabled, generate the web token with your `username` and `apikey`.

```
{
  "username": "jdoe",
  "password": "mypassword@123"
}
```

```
{
  "username": "your-domain\\jdoe",
  "password": "mypassword@123"
}
```

- ```
{
 "token":
 "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwiaWY2xpZW50VHlwZSI6IldlFQoiIsImxpY2Vuc2VzIjpbXSwiYXNjaWkiOiJkaXIiLCJ1c2Vybm9udGVhdGEiOiJkbGwjbG9uZSkuNSJ3Nur6x3PF62NeB3ZIdxiUPaFBu0Br84mPJMD4_EpwBfbsVOMH6ngILoV-U1Iw0JHiX2-Ug",
 "user": {
 "id": 9,
 "email": "a@a.com",
 "username": "jdoe",
 "domain": null,
 "firstName": "",

```

```

 "lastName": "",
 "version": 9,
 "principalId": 9,
 "deleted": false,
 "roles": [
 {
 "name": "API_Key_Generation",
 "id": 23,
 "version": 0
 },
 {
 "name": "AAE_Basic",
 "id": 2,
 "version": 0
 },
 {
 "name": "Docrole1",
 "id": 18,
 "version": 0
 }
],
 "sysAssignedRoles": [],
 "groupNames": [],
 "permissions": [
 . . .
],
 "licenseFeatures": [
 "RUNTIME"
],
 "emailVerified": true,
 "passwordSet": true,
 "questionsSet": true,
 "enableAutoLogin": false,
 "disabled": false,
 "clientRegistered": false,
 "description": "",
 "createdBy": 1,
 "createdOn": "2019-10-10T13:39:56-05:00",
 "updatedBy": 1,
 "updatedOn": "2019-10-13T02:09:38-05:00",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null
 }
}

```

Insert the token in the request header of subsequent API requests.

Related concepts

[Authentication API](#) on page 1171

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.

## Authenticate with username and apiKey API

Generate a JSON Web Token with your Enterprise Control Room username and an `apiKey`. This endpoint enables users to generate the token without the need for the user's password, such as for organizations that use single sign-on (SSO). By default, a token is valid for 20 minutes.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

To generate the token, you require the following:

- A custom role with the Generate API-Key permission
- Valid username and API-key to the Enterprise Control Room. The API-Key is a 40-character string generated in the Enterprise Control Room.

[Create and assign API key generation role](#) on page 1175

1. Use the POST method and endpoint URL: `<your_control_room_url>/v1/authentication`.

Request body:

```
{
 "username": "jdoe",
 "apiKey": "3/.Z)8:P`+yVJq . . . *fTk.i>|VOOl&:"
}
```

Request body with domain: Depending on how your Enterprise Control Room is configured, a domain might be required with the username.

```
{
 "username": "your-domain\\jdoe",
 "apiKey": "3/.Z)8:P`+yVJq . . . *fTk.i>|VOOl&:"
}
```

2. Send the request.

Response body: A successful response returns the token as a 703-character string.

```
{
 "token":
 "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwia2xpZW50VHlwZSI6IldFQiIsImxpY2Vuc2VzIjpbXSwiYt1lCBg_cDGBwj5FvaBt9u5xKu5W5j3Nur6x3PF62NeB3ZIdxiUPaFBU0Br84mPJMD4_EpwBfbsVOMH6ngiL oV-U1Iw0JHiX2-Ug",
 "user": {
 "id": 9,
 "email": "a@a.com",
 "username": "jdoe",
 "domain": null,
 "firstName": "",
 "lastName": "",
 "version": 9,
 "principalId": 9,
 "deleted": false,
 "roles": [
 {
 "name": "API_Key_Generation",
 "id": 23,
 "version": 0
 }
]
 }
}
```

```

 },
 {
 "name": "AAE_Basic",
 "id": 2,
 "version": 0
 },
 {
 "name": "Docrole1",
 "id": 18,
 "version": 0
 }
],
 "sysAssignedRoles": [],
 "groupNames": [],
 "permissions": [
 . . .
],
 "licenseFeatures": [
 "RUNTIME"
],
 "emailVerified": true,
 "passwordSet": true,
 "questionsSet": true,
 "enableAutoLogin": false,
 "disabled": false,
 "clientRegistered": false,
 "description": "",
 "createdBy": 1,
 "createdOn": "2019-10-10T13:39:56-05:00",
 "updatedBy": 1,
 "updatedOn": "2019-10-13T02:09:38-05:00",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null
}
}

```

Insert the token in the request header of subsequent API requests.

Related concepts

[Authentication API](#) on page 1171

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.

Related tasks

[Authenticate with username and password API](#) on page 1172

Generate a JSON Web Token with your Enterprise Control Room username and password. By default, a token is valid for 20 minutes.

## Create and assign API key generation role

An administrator is able to create a custom role for API key generation and assign that custom role to users. By default this parameter is not enabled for any of the System-created roles.

This task describes how an administrator can create and assign a custom role for API key generation.

1. Log in as an administrator to the Enterprise Control Room.
2. Go to Administration > Roles.
3. Click Create role . . .

4. Scroll to the API section.
5. Select Generate API-Key.
6. Type a unique name in the Role name field.
7. Click Create role.
8. Go to Administration > Users, and assign the custom role you just created to non-admin users.
9. Log in as the user you assigned the Generate API-Key role to.
10. Under the user name, click Generate API-Key, and copy the API-Key to your clipboard.

Use the API-Key to log into an Enterprise Control Room using SSO, or use the API-Key to log in a user without the user's password.

Related tasks

[Authenticate with username and apiKey API](#) on page 1174

Generate a JSON Web Token with your Enterprise Control Room `username` and an `apiKey`. This endpoint enables users to generate the token without the need for the user's password, such as for organizations that use single sign-on (SSO). By default, a token is valid for 20 minutes.

## Validate an authentication token API

Verify if a JSON Web Token is valid.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

1. Use the GET method and endpoint URL: `<your_control_room_url>/v1/authentication/token?token=<token>`.



Note: This endpoint does not have a request body; insert the token that you want to validate in the URL.

2. Send the request.

Response body:

The token is valid.

```
{
 "valid": true
}
```

The token is invalid.

```
{
 "valid": false
}
```

If the token is valid, you can use this endpoint to generate a fresh token that is valid for another 20 minutes: [Refresh a valid authentication token API](#) on page 1177.

If the token is not valid, you must generate a token using one of the authentication methods: [Authentication API](#) on page 1171

Related concepts

[Authentication API](#) on page 1171

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.

## Refresh a valid authentication token API

Generate a JSON Web Token using a valid token. This endpoint provides you with a new token without the need to collect and authenticate credentials every time a token expires. By default, a token is valid for 20 minutes.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Verify if a JSON Web Token is valid: [Validate an authentication token API](#) on page 1176.

1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v1/authentication/token.

Request body:

```
{
 "token":
 "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwia2xpZW50VHlwZSI6IldFQiIsImxpY2Vuc2VzIjpbXSwiY
 iCO-vs--8b_pLG9XSUR0186uvXFopB75eVAaG-1l_AZhR78UE6Voi7_UggzHkLRrEpQ-
 szR7cmFDpLxZ28xLnFJYhaIuMNdW9dWDVquBWTQSpYGNJd56D-
 tFFHBodwVdNamqWHxaQebqlzMyUyQV6Q-gKdgubpT5gwuXnp-
 BwScjHOYM3Fpj_nt0nEbJC5uWpJNtLQBpVzhsRwwlRKNOHQVbo6X7zkvKBoij8ewa5FWQwX7T-760BeqfssR
 X5PcyCkrVJju2XqItQ9XMGNP7h_MaUDotU_CJyguPZA"
}
```

2. Send the request.

Response body: The response includes a new token with an updated expiration time.

```
{
 "token":
 "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwia2xpZW50VHlwZSI6IldFQiIsImxpY2Vuc2VzIjpbXSwiY
 GQ3T8fndjw",
 "user": {
 "id": 1,
 "email": "a@a.com",
 "username": "admin",
 "domain": null,
 "firstName": "",
 "lastName": "",
 "version": 1,
 "principalId": 1,
 "deleted": false,
 "roles": [
 {
 "name": "AAE_Admin",
 "id": 1,
 "version": 0
 }
],
 ". . ."
],
 "licenseFeatures": [],
 "emailVerified": true,
 "passwordSet": true,
 "questionsSet": true,
 "enableAutoLogin": false,
 "disabled": false,
}
```

```

 "clientRegistered": false,
 "description": "",
 "createdBy": 0,
 "createdOn": "2019-09-25T16:03:05-05:00",
 "updatedBy": 0,
 "updatedOn": "2019-09-25T16:03:05-05:00",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null
 }
}

```

Related concepts

[Authentication API](#) on page 1171

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.

## Expire an authentication token API

Immediately log out the user and invalidate their JSON Web Token so that it cannot be used for authentication.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

1. Use the POST method and endpoint URL: `<your_control_room_url>/v1/authentication/logout`.



Note: This endpoint does not have a request body; insert the token that you want to expire in the request header.

2. Send the request.  
Response: A 204 response code indicates that the request was successful.

Related tasks

[Authenticate with username and apiKey API](#) on page 1174

Generate a JSON Web Token with your Enterprise Control Room `username` and an `apiKey`. This endpoint enables users to generate the token without the need for the user's password, such as for organizations that use single sign-on (SSO). By default, a token is valid for 20 minutes.

## Bot Scheduler APIs

Use the Bot Scheduler APIs to create, update, delete, and return details on scheduled automations.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

## Prerequisites

Ensure that you are allocated the following resources:

- Schedule my bots to run feature permission

- Run and schedule permissions for the folders that contain the bots.
- Access to the Bot Runner licensed users.
- Access to either a default device or a device pool



Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.

## Create an automation schedule

1. [Authenticate the user](#)
2. [List files and folders by workspace API](#) on page 1250
3. [List available unattended Bot Runners API](#) on page 1215
4. Optional: [List device pools API](#) on page 1217
5. [Schedule bot to run API](#) on page 1179

## Schedule bot to run API

Schedule a bot to run on an unattended Bot Runner either one time or on a recurring basis.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- Ensure that you are allocated the following resources:
  - View and Run my bots feature permission
  - Run and schedule permissions for the folders that contain the bots
  - Access to Bot Runner licensed users
  - Access to either a default device or a device pool



Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.

To schedule a bot, you provide the following information to the API:

| Parameter    | Required | Type   | Description                                                                                                                                        |
|--------------|----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| fileId       | Yes      | Number | Identifier for the bot. <a href="#">List files and folders by workspace API</a> on page 1250                                                       |
| runAsUserIds | Yes      | Number | Identifier for a user that is registered with your Enterprise Control Room. <a href="#">List available unattended Bot Runners API</a> on page 1215 |



| Parameter | Required | Type   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| poolIds   | No       | Number | <p>Identifier of a device pool that has at least one active device.</p> <p> Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.</p> <p><a href="#">List device pools API</a> on page 1217</p> |

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <control\_room\_url>/v1/schedule/automations.

Request body:

This example request body contains the required parameters to schedule a bot to run one time.

```
{
 "name": "UpdateInventory.20.12.16.10.40.48",
 "fileId": "14277",
 "poolIds": [
 "27"
],
 "timeZone": "Asia/Calcutta",
 "runAsUserIds": [
 "472",
 "480",
 "80"
],
 "startDate": "2020-12-16",
 "startTime": "15:00",
 "scheduleType": "NONE"
}
```

This example request body contains the required parameters to schedule a bot to run on a recurring basis.

```
{
 "name": "UpdateInventory.20.12.16.10.40.48",
 "fileId": "14277",
 "poolIds": [
 "27"
],
 "timeZone": "Australia/Melbourne",
 "runAsUserIds": [
 "1103",
 "36",
 "80"
],
 "startDate": "2020-12-16",
 "repeatOccurrence": {
 "endTime": "23:59",
 "runEvery": "1",
 "timeUnit": "HOURS"
 },
 "repeatEnabled": true,
 "endDate": "2020-12-24",
 "startTime": "20:45",
 "weeklyRecurrence": {
 "interval": "1",

```

```

 "daysOfWeek": [
 "TUE",
 "THU",
 "FRI"
],
 },
 "scheduleType": "WEEKLY"
}

```

3. Send the request.

Response body: The two example responses include the following information about the automation:

- `id`: the numerical value that identifies the automation. Use this parameter in the `Update automations` or `Delete automations` APIs.
- `zonedNextRunDateTime`: the date and time of the next time the bot is scheduled to run.

This is an example response for a bot scheduled to run one time.

```

{
 "id": "989",
 "name": "UpdateInventory.20.12.16.10.40.48",
 "fileId": "14277",
 "status": "ACTIVE",
 "deviceIds": [],
 "description": "",
 "rdpEnabled": false,
 "scheduleType": "NONE",
 "timeZone": "Asia/Calcutta",
 "startDate": "2021-12-16",
 "endDate": "",
 "startTime": "15:00",
 "repeatEnabled": false,
 "zonedNextRunDateTime": "2021-12-16T09:30:00Z",
 "createdBy": "1103",
 "createdOn": "2021-01-11T18:57:18.932407Z",
 "updatedBy": "1103",
 "updatedOn": "2021-01-11T18:57:18.932422Z",
 "tenantId": "1",
 "fileName": "appsheets",
 "filePath": "Automation Anywhere\\Bots\\appsheets",
 "runAsUserIds": [
 "480",
 "80",
 "472"
],
 "botInput": {},
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "poolId": [
 "11"
],
 "overrideDefaultDevice": false,
 "runElevated": false
}

```

This is an example response for a bot scheduled to run on a recurring basis.

```

{
 "id": "990",
 "name": "UpdateInventory.20.12.16.10.40.48",
 "fileId": "14277",
 "status": "ACTIVE",

```

```

 "deviceIds": [],
 "description": "",
 "rdpEnabled": false,
 "scheduleType": "WEEKLY",
 "weeklyRecurrence": {
 "interval": 1,
 "daysOfWeek": [
 "TUE",
 "THU",
 "FRI"
]
 },
 "timeZone": "Australia/Melbourne",
 "startDate": "2021-01-16",
 "endDate": "2021-12-24",
 "startTime": "20:45",
 "repeatEnabled": true,
 "repeatOccurrence": {
 "runEvery": "1",
 "timeUnit": "HOURS",
 "endTime": "23:59"
 },
 "zonedNextRunDateTime": "2021-01-19T09:45:00Z",
 "createdBy": "1103",
 "createdOn": "2021-01-11T18:59:31.182663Z",
 "updatedBy": "1103",
 "updatedOn": "2021-01-11T18:59:31.182669Z",
 "tenantId": "1",
 "fileName": "a_trigger",
 "filePath": "Automation Anywhere\\Bots\\a_trigger",
 "runAsUserIds": [
 "80",
 "36",
 "1103"
],
 "botInput": {},
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "poolId": [
 "7"
],
 "overrideDefaultDevice": false,
 "runElevated": false
 }
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Use the [List automation schedules API](#) on page 1182 to retrieve details on all the scheduled automations.

## List automation schedules API

Retrieve details of the automation schedules that you have permissions to view.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.

- You must be assigned a role that includes the View and manage all scheduled activity from my Folders permission.

In this example, you list all the scheduled automations sorted by the next run date and time.

- Add the authentication token to the request header.
- Use the POST method and endpoint URL: <control\_room\_url>/v1/schedule/automations/list.

Request body:

```
{
 "sort": [
 {
 "field": "zonedNextRunDateTime",
 "direction": "asc"
 }
]
}
```

- Send the request.

Response body: The response includes the following data about each automation:

- id: the numerical value that identifies the automation. Use this parameter in the Update automations or Delete automations APIs.
- status: returns whether the scheduled automation is ACTIVE or INACTIVE.

```
{
 "page": {
 "offset": 0,
 "total": 3,
 "totalFilter": 3
 },
 "list": [
 {
 "id": "661",
 "name": "eodReport_28.20.10.12.23.02.48",
 "fileId": "6598",
 "status": "ACTIVE",
 "deviceIds": [],
 "description": "",
 "rdpEnabled": false,
 "scheduleType": "DAILY",
 "dailyRecurrence": {
 "interval": 3
 },
 "timeZone": "America/Los Angeles",
 "startDate": "2020-10-12",
 "endDate": "",
 "startTime": "23:30",
 "repeatEnabled": true,
 "repeatOccurrence": {
 "runEvery": "3",
 "timeUnit": "HOURS",
 "endTime": "23:59"
 },
 "zonedNextRunDateTime": "2021-01-14T07:30:00Z",
 "createdBy": "251",
 "createdOn": "2020-10-13T06:01:51.992433Z",
 "updatedBy": "251",
 "updatedOn": "2021-01-11T07:30:00.082057Z",
 }
]
}
```

```

 "tenantId": "1",
 "fileName": "wlm_28",
 "filePath": "Automation Anywhere\\Bots\\West Coast",
 "runAsUserIds": [
 "251"
],
 "botInput": {},
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "poolId": [
 "23"
],
 "overrideDefaultDevice": false,
 "runElevated": false
 },
 {
 "id": "990",
 "name": "accounts.20.12.16.10.51.59",
 "fileId": "12501",
 "status": "ACTIVE",
 "deviceIds": [],
 "description": "",
 "rdpEnabled": false,
 "scheduleType": "WEEKLY",
 "weeklyRecurrence": {
 "interval": 1,
 "daysOfWeek": [
 "TUE",
 "THU",
 "FRI"
]
 },
 "timeZone": "Australia/Melbourne",
 "startDate": "2021-01-16",
 "endDate": "2021-12-24",
 "startTime": "20:45",
 "repeatEnabled": true,
 "repeatOccurrence": {
 "runEvery": "1",
 "timeUnit": "HOURS",
 "endTime": "23:59"
 },
 "zonedNextRunDateTime": "2021-01-19T09:45:00Z",
 "createdBy": "1103",
 "createdOn": "2021-01-11T18:59:31.182663Z",
 "updatedBy": "1103",
 "updatedOn": "2021-01-11T18:59:31.182669Z",
 "tenantId": "1",
 "fileName": "a_trigger",
 "filePath": "Automation Anywhere\\Bots\\APAC",
 "runAsUserIds": [
 "80",
 "36",
 "1103"
],
 "botInput": {},
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "poolId": [
 "7"
],
 "overrideDefaultDevice": false,
 "runElevated": false
 },
 {
 "id": "989",

```

```

 "name": "UpdateInventory.20.12.16.10.40.48",
 "fileId": "11201",
 "status": "ACTIVE",
 "deviceIds": [],
 "description": "",
 "rdpEnabled": false,
 "scheduleType": "NONE",
 "timeZone": "Asia/Calcutta",
 "startDate": "2021-12-16",
 "endDate": "",
 "startTime": "15:00",
 "repeatEnabled": false,
 "zonedNextRunDateTime": "2021-12-16T09:30:00Z",
 "createdBy": "1103",
 "createdOn": "2021-01-11T18:57:18.932407Z",
 "updatedBy": "1103",
 "updatedOn": "2021-01-11T18:57:18.932422Z",
 "tenantId": "1",
 "fileName": "appsheets",
 "filePath": "Automation Anywhere\\Bots\\spreadsheets",
 "runAsUserIds": [
 "480",
 "80",
 "472"
],
 "botInput": {},
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "poolId": [
 "11"
],
 "overrideDefaultDevice": false,
 "runElevated": false
 }
]
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

## Bot Execution Orchestrator API

As an Enterprise Control Room administrator or a user with View and Manage Scheduled Activity permission, you can monitor the bot progress using a set of Enterprise Control Room APIs.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### High-level process for monitoring bots

Searchable fields for devices:

- **hostName:** The host name of the device configured as a Bot Runner. If a naming convention is used for host names, searching on a unique substring in the host name is an effective way to identify Bot Runner devices.
- **userId:** The unique numeric identification for a specific user also identifies the Bot Runner device. Unique user naming conventions can be used to identify users and devices that are licensed and configured as Bot Runners.

Searchable fields for bots:

- **name:** The unique name of a bot. You can search on the exact name (eq) or a text string (substring) that is contained in the bots name.
- **path:** The relative path of a folder in the Enterprise Control Room. You can search on a full path or a substring contained in the path.

## Request device details

Use this API to retrieve a list of devices that are available for bot deployment.

Roles and license

You have to authenticate as a user with an Unattended bot runner license.

- URL:

```
http://<your_control_room_url>/v2/devices/list
```

- Method: POST

Supported filterable parameters:

id

The numeric identifier for a device.

- Field: id
- Type: integer

```
{
 "filter": {
 "operator": "eq",
 "value": "7",
 "field": "id"
 }
}
```

hostName

The name of the registered device.

- Field: hostName
- Type: string

```
{
 "filter": {
 "operator": "substring",
 "value": "AA",
 "field": "hostName"
 }
}
```

userId

A unique numeric identifier for the user associated with the registered device.

- Field: userId
- Type: long

```
{
 "filter": {
 "operator": "eq",
```

```

 "value": "13",
 "field": "userId"
 }
 }
}

```

status

The connection status of device.

- Field: status
- Type: string

```

{
 "filter": {
 "operator": "eq",
 "value": "CONNECTED",
 "field": "status"
 }
}

```

This task requests a list of all devices with a specific string in the hostname parameter and specific status of the device. Use the list in the response to identify which devices are connected and available to run bots.

1. Use the POST method to generate an authentication JSON Web Token. Add the generated authentication token to the request header.

[Authentication API](#)

2. Select the POST method.
3. Enter the URL for the API:

```
https://<your_control_room_url>/v2/devices/list
```

4. In the request body, add the filtering, sorting, and pagination rules to retrieve the device list that you want to deploy.  
For example, this request body uses "and" as operator and the device "status" and "hostname" as field to filter the required results. The results will be sorted in "descending" order based on "status".

```

{
 "sort": [
 {
 "field": "status",
 "direction": "desc"
 }
],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "eq",
 "value": "CONNECTED",
 "field": "status"
 },
 {
 "operator": "substring",
 "value": "win",
 "field": "hostName"
 }
]
 },
 "fields": [

```



```

],
 "page": {
 "offset": 0,
 "total": 71,
 "totalFilter": 18,
 "length": 100
 }
 }
}

```

5. Send the request.

- In a REST client, click SEND.
- In the Swagger interface, click Execute.

Response body:

The response returns the details of two devices that are in the "connected" status and for which the hostName starts with "win" based on the requested filter criteria.

```

{
 "page": {
 "offset": 0,
 "total": 71,
 "totalFilter": 7
 },
 "list": [{
 "id": "163",
 "type": "ATTENDED_BOT_RUNNER",
 "hostName": "winwlm-2",
 "userId": "",
 "userName": "",
 "status": "CONNECTED",
 "poolName": "",
 "fullyQualifiedHostName": "-",
 "updatedBy": "b2",
 "updatedOn": "2020-07-07T08:24:56.091061Z",
 "botAgentVersion": "12.1"
 }, {
 "id": "162",
 "type": "ATTENDED_BOT_RUNNER",
 "hostName": "winwlm-1",
 "userId": "",
 "userName": "",
 "status": "CONNECTED",
 "poolName": "",
 "fullyQualifiedHostName": "-",
 "updatedBy": "b1",
 "updatedOn": "2020-07-07T08:24:55.982047Z",
 "botAgentVersion": "12.1"
 }
]
}

```

You can use the device IDs received in the response to deploy the bots on Bot Runners.

## Request bot deployment status API

When you deploy a bot you might want to verify the status of the bot deployment. This API enables you to know the deployment status of the bot you deployed.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You require the deploymentID to track the deployment status of a specific bot. This is the output of the [Deploy bots API](#) on page 1212.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/activity/list  
Request body:

```
{
 "filter": {
 "operator": "eq",
 "field": "deploymentId",
 "value": "14c2b6f8-c2a0-4a57-959d-ef413df0d179"
 }
}
```

3. Send the request.

Response body: In a successful request, this endpoint returns the deployment status as either COMPLETED, IN PROGRESS, or FAILED.

```
{
 "page": {
 "offset": 0,
 "total": 13,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "e49cea73-01fb-4a10-a7de-
ce3e7b83a5ae_0e6c0971292ea185",
 "automationName": "deploy-test_20.05.01.17.08.35_jdoe_API",
 "fileName": "deploy-test",
 "filePath": "Automation Anywhere\\Bots\\deploytest\\deploy-
test",
 "type": "TASK",
 "startDateTime": "2020-05-01T17:09:02Z",
 "endDateTime": "2020-05-01T17:09:05Z",
 "command": "",
 "status": "COMPLETED",
 "progress": 100,
 "automationId": "22260",
 "userId": "2538",
 "deviceId": "894",
 "currentLine": 1,
 "totalLines": 1,
 "fileId": "57911",
 "modifiedBy": "2540",
 "createdBy": "2538",
 "modifiedOn": "2020-05-01T17:08:47.657801Z",
 "createdOn": "2020-05-01T17:08:38.228573Z",
 }
]
}
```

```

 "deploymentId": "14c2b6f8-c2a0-4a57-959d-ef413df0d179",
 "queueName": "",
 "queueId": "",
 "usingRdp": false,
 "message": "",
 "canManage": false,
 "deviceName": "MyCompany-JohnDoe",
 "userName": "jdoe"
 }
]
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Bot Insight API

Users with the `AAE_Bot_Insight_Admin` or `AAE_Admin` role can access the Bot Insight API to retrieve business and operations data.

- Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- Automation Anywhere bots are built, run, and monitored in the Enterprise Control Room. Bot Insight accesses real-time business insights and digital workforce performance data to leverage content-level productivity data from the bots that are deployed.

Automation Anywhere bots are built, run, and monitored in the Enterprise Control Room. Bot Insight accesses real-time business insights and digital workforce performance data to leverage content-level productivity data from the bots that are deployed.

### Business data

The Business data endpoints return information about the Bot Insight data and statistics on the performance of deployed bots.

[Delete task log data](#) on page 1191

Users with the `AAE_Bot_Insight_Admin` role can use the API to delete the business data that is logged in the Bot Insight database for deployed bots.

```
DELETE /v2/botinsight/data/api/
deletetasklogdata
```

[Get bot variables data](#) on page 1197

Users with the `AAE_Bot_Insight_Admin` role can use the API to retrieve information on the variables in deployed bots, such as the variable name, data type, minimum value, and maximum value.

```
GET /v2/botinsight/data/api/
gettaskvariableprofile
```

[Get task log data](#) on page 1192

Users with the `AAE_Bot_Insight_Admin` role can use the API to retrieve business data that is

logged in the Bot Insight database for deployed bots.

```
GET /v2/botinsight/data/api/
gettasklogdata
```

## Operations data

The Operations data endpoints return information about bots in public and private repositories that are deployed on different Bot Runner machines.

### Get audit trail data

Users with the `AAE_Admin` role or a custom role with `View everyone's audit log actions` permission can use this API to retrieve information about Enterprise Control Room events.

```
GET /v2/botinsight/data/api/
getaudittraildata
```

### Get bot run data

Users with the `AAE_Bot Insight Admin` or `AAE_Admin` role can use this API to get information about the bot run data, such as on which server it ran and whether it ran successfully or encountered an error.

```
GET /v2/botinsight/data/api/
getbotrundata
```

## Delete task log data

Users with the `AAE_Bot Insight Admin` role can use the API to delete the business data that is logged in the Bot Insight database for deployed bots.

```
DELETE <control_room_URL>/v2/botinsight/data/api/deletetasklogdata
```

Table 3: Body parameters

| Parameter   | Description                                                                                                                 | Type   | Required | Notes |
|-------------|-----------------------------------------------------------------------------------------------------------------------------|--------|----------|-------|
| botname     | Name of the bot for which to retrieve data. If you do not provide this parameter, the API will return data on all the bots. | string | optional |       |
| repository  | Enterprise Control Room repository path of the bot.                                                                         | string | optional |       |
| environment | Specifies the environment: DEV or PROD                                                                                      | string | optional |       |
| runId       | ID number that is generated when the bot runs.                                                                              | string | optional |       |

| Parameter | Description                                                                                                                                                                                                                                                                                                    | Type | Required | Notes                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|----------------------------------------------------------------|
| fromDate  | <p>Start date of the period for which to retrieve the data. If you do not provide this parameter, the API will return all available data.</p> <p> Note: Do not provide this parameter if you provide the runId parameter.</p> | date | optional | Format yyyy-mm-ddThh:mm:ss                                     |
| toDate    | <p>End date of the period for which to retrieve the data.</p> <p> Note: Do not provide this parameter if you provide the runId parameter.</p>                                                                                 | date | optional | <p>Default: current date</p> <p>Format yyyy-mm-ddThh:mm:ss</p> |

Table 4: Header

| Header name     | Value                                                                     |
|-----------------|---------------------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API on page 1171</a> |

## Sample output

Returns the number of rows deleted.

```
{
 "botName": "DemoBot",
 "repositoryPath": "Automation Anywhere/Bots/testBot",
 "deleteCount": "1"
}
```

## Get task log data

Users with the AAE\_Bot Insight Admin role can use the API to retrieve business data that is logged in the Bot Insight database for deployed bots.

```
GET <control_room_URL>/v2/botinsight/data/api/gettasklogdata
```

Table 5: Query parameters

| Parameter | Description                                                                                                                                                                                                                                                                                    | Type    | Required | Notes                                                   |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|---------------------------------------------------------|
| botname   | Name of the bots for which to retrieve data. Separate each bot name with a comma.<br><br>If you do not provide this parameter, the API will return data on all the bots.                                                                                                                       | string  | optional | Enter up to 10 bot names.                               |
| pageno    | Page number from which to retrieve the data.                                                                                                                                                                                                                                                   | integer | optional |                                                         |
| limit     | Specifies the number of parts in which the information is retrieved. For example, if you specify the limit as 2500 to retrieve a total of 10000 records, then:<br><br>0 page returns 1 - 2500<br>1st page returns 2501 - 5000<br>2nd page returns 5001 - 7500<br>3rd page returns 7501 - 10000 | integer | optional | Min value: 1                                            |
| fromDate  | Start date of the period for which to retrieve the data. If you do not provide this parameter, the API will return all available data.                                                                                                                                                         | date    | optional | Format yyyy-mm-ddThh:mm:ss                              |
| toDate    | End date of the period for which to retrieve the data.                                                                                                                                                                                                                                         | date    | optional | Default: current date<br><br>Format yyyy-mm-ddThh:mm:ss |

Table 6: Header

| Header name     | Value                                                                     |
|-----------------|---------------------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API on page 1171</a> |

## Sample output

```
{
 "businessData": [
 {
 "totalRecords": 23,
 "count": 23,
 "pageNo": 1,
 "botId": "PROD_12",
 "botName": "testBot",
 "repositoryPath": "Automation Anywhere/Bots/testBot",

```

```

 "list": [
 {
 "transactionName": "block1",
 "transactions": [
 {
 "executionId": "e05f4c41-00e5-4b1b-93a6-8fefe5462e51",
 "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",
 "dateLogged": "2019-10-24T09:25:02.194365800Z",
 "data": {
 },
 "environment": "PROD"
 }
]
 },
 {
 "transactionName": "block2",
 "transactions": [
 {
 "executionId": "e05f4c41-00e5-4b1b-93a6-8fefe5462e51",
 "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",
 "dateLogged": "2019-10-24T09:25:02.194365800Z",
 "data": {
 },
 "environment": "PROD"
 }
]
 }
]
 }
}

```

## Get Bot Insight bot run data

Users with the AAE\_Bot Insight Admin or AAE\_Admin role can use this API to get information about the bot run data, such as on which server it ran and whether it ran successfully or encountered an error.

GET <control\_room\_URL>/v2/botinsight/data/api/getbotrundata

Table 7: Query parameters

| Parameter | Description                                                                                                                                                                                                                                                                                    | Type    | Required | Notes |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-------|
| pageno    | Page number from which to retrieve the data.                                                                                                                                                                                                                                                   | integer | optional |       |
| limit     | Specifies the number of parts in which the information is retrieved. For example, if you specify the limit as 2500 to retrieve a total of 10000 records, then:<br><br>0 page returns 1 - 2500<br>1st page returns 2501 - 5000<br>2nd page returns 5001 - 7500<br>3rd page returns 7501 - 10000 | integer | optional |       |

| Parameter | Description                                                                                                                            | Type | Required | Notes                                               |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------|------|----------|-----------------------------------------------------|
| fromDate  | Start date of the period for which to retrieve the data. If you do not provide this parameter, the API will return all available data. | date | optional | Format yyyy-mm-ddThh:mm:ss                          |
| toDate    | End date of the period for which to retrieve the data.                                                                                 | date | optional | Default: current date<br>Format yyyy-mm-ddThh:mm:ss |

Table 8: Header

| Header name     | Value                                                                     |
|-----------------|---------------------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</a> on page 1171 |

### Sample output

```
{
 "totalRecords": 0,
 "botRunDataList": [
 {
 "id": 0,
 "userName": "string",
 "hostName": "string",
 "fileName": "string",
 "fileType": "string",
 "startDate": "string",
 "endDate": "string",
 "status": "string",
 "totalLines": 0,
 "currentLine": 0,
 "timeTaken": 0,
 "progress": 0
 }
]
}
```

### Get Bot Insight audit trail data

Users with the AAE\_Admin role or a custom role with View everyone's audit log actions permission can use this API to retrieve information about Enterprise Control Room events.

```
GET <control_room_URL>/v2/botinsight/data/api/getaudittraildata
```



Table 9: Query parameters

| Parameter | Description                                                                                                                                                                                                                                                                                       | Type    | Required | Notes                                                   |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|---------------------------------------------------------|
| pageno    | Page number from which to retrieve the data.                                                                                                                                                                                                                                                      | integer | optional |                                                         |
| limit     | Specifies the number of parts in which the information is retrieved.<br>For example, if you specify the limit as 2500 to retrieve a total of 10000 records, then:<br><br>0 page returns 1 - 2500<br>1st page returns 2501 - 5000<br>2nd page returns 5001 - 7500<br>3rd page returns 7501 - 10000 | integer | optional |                                                         |
| fromDate  | Start date of the period for which to retrieve the data. If you do not provide this parameter, the API will return all available data.                                                                                                                                                            | date    | optional | Format yyyy-mm-ddThh:mm:ss                              |
| toDate    | End date of the period for which to retrieve the data.                                                                                                                                                                                                                                            | date    | optional | Default: current date<br><br>Format yyyy-mm-ddThh:mm:ss |

Table 10: Header

| Header name     | Value                                                                     |
|-----------------|---------------------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</a> on page 1171 |

## Sample output

```
{
 "totalRecords": 0,
 "auditTrailDataList": [
 {
 "activityType": "string",
 "createdBy": "Unknown Type: integer",
 "createdOn": "string",
 "detail": "string",
 "environmentName": "string",
 "eventDescription": "string",
 "hostName": "string",
 "id": "string",
 "objectName": "string",
 "requestId": "string",
 "source": "string",
 "status": "string",
 "userName": "string"
 }
]
}
```

```

 }
]
}

```

## Get bot variables data

Users with the **AAE\_Bot Insight Admin** role can use the API to retrieve information on the variables in deployed bots, such as the variable name, data type, minimum value, and maximum value.

```
GET <control_room_URL>/v2/botinsight/data/api/gettaskvariableprofile
```

Table 11: Query parameters

| Parameter      | Description                                         | Type   | Required | Notes |
|----------------|-----------------------------------------------------|--------|----------|-------|
| botname        | Name of the bot for which to retrieve data.         | string | optional |       |
| repositoryPath | Enterprise Control Room repository path of the bot. | string | optional |       |

Table 12: Header

| Header name     | Value                                                                     |
|-----------------|---------------------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</a> on page 1171 |

## Sample output

```

{
 "businessData": [
 {
 "totalRecords": 23,
 "count": 23,
 "pageNo": 1,
 "botId": "PROD_12",
 "botName": "testBot",
 "repositoryPath": "Automation Anywhere/Bots/testBot",
 "list": [
 {
 "transactionName": "block1",
 "transactions": [
 {
 "executionId": "e05f4c41-00e5-4b1b-93a6-8fefe5462e51",
 "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",
 "dateLogged": "2019-10-24T09:25:02.194365800Z",
 "data": {
 "environment": "PROD"
 }
 }
]
 }
]
 }
]
}

```

```

 "transactionName": "block2",
 "transactions": [
 {
 "executionId": "e05f4c41-00e5-4b1b-93a6-8fefe5462e51",
 "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",
 "dateLogged": "2019-10-24T09:25:02.194365800Z",
 "data": {
 },
 "environment": "PROD"
 }
]
 }
}
]
}
]
}
}
}

```

## Bot Lifecycle Management API

Use the Bot Lifecycle Management API to export and import bots with dependent files and command packages for comprehensive automation lifecycle management. Users can export bots from public workspace and import to a private workspace in another Enterprise Control Room and check into a public workspace.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Overview

You can use the Enterprise Control Room Export and Import REST API to manage your automation TaskBots, including dependent files in different environments such as development, testing, and production based on your organization's automation requirements.

For example, you can move bots that are verified as production-ready from test to production.

### Import 11.x bots in Enterprise A2019 for migration

The BLM import feature also support to import your 11.x bots from 11.x Enterprise Control Room instance to Enterprise A2019. This enables you to consolidate the 11.x bots from multiple Enterprise Control Room repository in a single Enterprise A2019 repository.

### Permissions required to move bots

To export bots from the Enterprise Control Room, you must have the following permissions:

- Export bot and View packages feature permissions
- Check in or Check out folder permissions

To import bots to the Enterprise Control Room, you must have the following permissions:

- Import bot and Manage package feature permissions
- Check in folder permission
- Bot Creator license

## Moving a bot

To move a bot from one environment to another, follow these steps:

1. Use the Export API to export the bot from the Enterprise Control Room in the source environment.  
[Export files using API](#) on page 1199
2. Use the Import API to import the bot into the Enterprise Control Room in the destination environment.  
[Import files using API](#) on page 1200

Related concepts

[Bot Lifecycle Management](#) on page 1160

The Automation Anywhere Bot Lifecycle Management (BLM) feature enables you to move a bot from one environment to another. For example, you can move a bot from the development or testing environment to the production environment.

## Export files using API

You can export bots with their dependent files using the Export API.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- You must have Export bots, View package, and Check in or Check out permissions to the required folders.
- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- A file ID of the bot you want to export from the public folder.

[List files and folders by workspace API](#) on page 1250



Note: Users can only view the folders and subfolders they have permissions to access.

- The following API URLs:
  - `https://<your_control_room_url>/v2/blm/export`: To export repository bots
  - `https://<your_control_room_url>/v2/blm/status/{requestId}`: To get export status by request ID
  - `https://<your_control_room_url>/v2/blm/download/{downloadFileId}`: To download the exported bot

1. Add the authentication token to the request header.
2. Search for one or more file IDs of the bot you want to export.
3. Use the POST method and endpoint URL: `https://<your_control_room_url>/v2/blm/export`.

The following example request body, exports the bot with `fileId` 2197 along with the packages required for bot.

Request body:

```
{
 "name": "export-docs",
 "fileIds": [
 2197
```

```
],
 "includePackages": true
}
```

4. Send the request.  
The following response body returns the `requestId`.

Response body:

```
{
 "requestId": "987c0de3-b158-4e71-975e-27d10b9a83fb"
}
```

5. Use the GET method and endpoint URL: `<your_control_room_url>/v2/blm/status/{requestId}`

Enter the `requestId` generated in Step 4 to know the status of export.

```
https://192.0.2.0/v2/blm/status/987c0de3-b158-4e71-975e-27d10b9a83fb
```

6. Send the request.  
The following response body returns the `status` and `downloadFileId`.

Response body:

```
{
 "requestId": "987c0de3-b158-4e71-975e-27d10b9a83fb",
 "type": "EXPORT",
 "status": "COMPLETED",
 "downloadFileName": "export-docs",
 "downloadFileId": "ZXhwb3J0LWRvY3M=",
 "errorMessage": ""
}
```

7. Use the GET method and endpoint URL: `<your_control_room_url>/v2/blm/download/{downloadFileId}`

Enter the `downloadFileId` generated in Step 6.

```
https://192.0.2.0/v2/blm/download/ZXhwb3J0LWRvY3M=
```

8. Send the request.  
The dialog box appears. Browse the path and save the exported package in zip file format.  
The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Import the exported file in the private folder of the target Enterprise Control Room.

Related tasks

[Export bots](#) on page 1162

You can export a bot from one Enterprise Control Room to another.

## Import files using API

You can import bots with their dependent files using the Import API.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- You must have Import bots, Manage package, and Check in permissions to the necessary folders and Bot Creator license.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- The following API URLs:
  - `https://<your_control_room_url>/v2/blm/import`: To import repository bot
  - `https://<your_control_room_url>/v2/blm/status/{requestId}`: To get import status by request ID
- To import the 11.x bots into your Enterprise Control Room, you must have the required `aapkg` package that you created using the BLM Export API in the 11.x Enterprise Control Room instance.

The `aapkg` package must be present in the same Enterprise A2019 machine where you want to import the 11.x bots.

You can import the password-protected `aapkg` packages using the Import API only.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `https://<your_control_room_url>/v2/blm/import`.

The following request body uploads the `zip` file and imports in the target Enterprise Control Room. It also overwrites if a file with the same name already exists.

Request body:

```
{
 "upload": "export-docs.zip",
 "actionIfExists": "OVERWRITE"
}
```

3. Send the request. Send the request.  
The following response body returns `requestId`.

Response body:

```
{
 "requestId": "eafef543-2d7a-47f5-81d0-490d09dd68d2"
}
```

4. Use the GET method and endpoint URL: `<your_control_room_url>/v2/blm/status/{requestId}`

Enter the `requestId` generated in Step 3 to know the status of import.

Request body:

```
https://192.0.2.0/v2/blm/status/eafef543-2d7a-47f5-81d0-490d09dd68d2
```

5. Send the request.  
The following response body returns the status.

Response body:

```
{
 "requestId": "fa4b0c56-fab8-42ef-8d96-fc6b53e1cbaa",
 "type": "IMPORT",
 "status": "COMPLETED",
 "downloadFileName": "",
 "downloadFileId": "",
 "errorMessage": ""
}
```

The **COMPLETED** status indicates that the file is successfully imported. You can find the imported file in your Enterprise Control Room

The 11.x bots are imported in the Bots > My Tasks folder or Bots > My Metabots folder in the `.atmx` or `.mbot` file format.

Use the migration wizard to convert the 11.x bots files into the `.bot` format that is supported in Enterprise A2019.

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

#### Related tasks

[Import bots](#) on page 1163

You can import bots with their dependencies from one Enterprise Control Room to another. The source environment can be either an Enterprise A2019 Control Room or a 11.x Control Room instance.

## Credential Vault APIs

As an Enterprise Control Room user with Manage my credentials and lockers feature permissions, you have the option to use the Credential Vault API to manage your attributes, credentials, and lockers in the Enterprise Control Room.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

By default, all users can create credentials. You are the Credential owner of any credentials that you created. As a Credential owner, you can update, delete, and transfer the ownership of your credentials.

### Configure the Credential Vault for your organization

As a Locker admin, configure a locker and a credential, then assign the credential to the locker. It is also acceptable to first configure a credential, then a locker.

1. [Authenticate the user](#).  
Use the POST method to generate an authentication JSON Web Token.
2. [Configure a locker using API](#) on page 1203
3. [Configure a credential with attribute values using API](#) on page 1205
4. [Assign credential to locker API](#) on page 1208

### Manage your credentials

Authenticate yourself as a basic user to retrieve the list of credentials that you have access to then assign a value to a specific attribute.

1. [Authenticate the user](#).  
Use the POST method to generate an authentication JSON Web Token.
2. [List credentials using API](#) on page 1209
3. [Assign value to attribute using API](#) on page 1210

## Set device login credentials API

Use the login setting endpoint of the Credential Vault API to programatically update the username and password for a device.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You can use this endpoint to set or update the login credentials for your own device without additional permissions.

To set or update the login credentials on other users' devices, for example, to deploy bots on unattended Bot Runners, you must have the AAE\_admin role or a custom role with the Bot Auto-Login Credentials API permission.

1. Use the PUT method and endpoint URL: <control\_room\_URL>/v2/credentialvault/loginsetting.

Request body:



Note: If the username includes a domain, use a double backslash between the domain and user.

```
{
 "loginUsername": "aai\\katherine.johnson",
 "loginPassword": "{{password}}"
}
```

2. Send the request.

Response body:

```
"Credentials updated for katherine"
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Configure a locker using API

Use a combination of endpoints to create a locker and assign locker access permissions to users.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You must be assigned the AAE\_Admin, AAE\_Locker Admin role or have a custom role that includes the Manage my lockers permission.

You will provide the role ID to assign consumer access to users [Search for roles API](#) on page 1258.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL:<your\_control\_room\_url>/v2/credentialvault/lockers to create the locker.



Request body:

```
{
 "name": "HumanResourcesCredentials",
 "description": "Login credentials for the HR dept"
}
```

3. Send the request.

Response body: In a successful request, this endpoint returns the `id`, which is a unique numeric identifier for the locker. Use the locker ID in subsequent API requests, such as to add consumers or credentials to the locker.

```
{
 "id": "1551",
 "name": "HumanResourcesCredentials",
 "description": "Login credentials for the HR dept",
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:24:40.462253Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:24:40.462259Z",
 "version": "0"
}
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Assign locker access permissions to users. [Locker permissions](#) on page 261

4. Optional: Assign another locker owner. Use the PUT method and endpoint  
URL:<your\_control\_room\_url>/v2/credentialvault/lockers/{lockerId}/members/{userId}.



Note: The locker creator is automatically assigned the locker owner permission.

Request body:

```
{
 "permissions": [
 "own"
]
}
```

5. Send the request.

Response body: This endpoint does not return data.

6. Optional: Assign a locker manager. Use the PUT method and endpoint  
URL:<your\_control\_room\_url>/v2/credentialvault/lockers/{lockerId}/members/{userId}.

Request body:

```
{
 "permissions": [
 "manage"
]
}
```

7. Send the request.

Response body: This endpoint does not return data.

8. Optional: Assign a locker participant. Use the PUT method and endpoint URL: <your\_control\_room\_url>/v2/credentialvault/lockers/{lockerId}/members/{userId}.  
Request body:

```
{
 "permissions": [
 "participate"
]
}
```

9. Send the request.  
Response body: This endpoint does not return data.
10. Assign locker consumers. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/credentialvault/lockers/{lockerId}/consumers  
Request body: Provide the role ID. All users who are assigned that custom role can build and run bots using the credentials in this locker, as well as enter values into credentials that accept user-provided attribute values.  

```
{
 "id": "516"
}
```
11. Send the request.  
Response body: This endpoint does not return data.

If you are following the steps to configure your Credential Vault, do this next: [Assign credential to locker API](#) on page 1208.

## Configure a credential with attribute values using API

Create a credential with a standard attribute and add two additional attributes with user-input values.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- All roles have the `Manage my credentials` and `lockers` permission that is necessary to configure credentials and attributes. No additional permissions are necessary to use this endpoint.

In this example, you configure a credential with three attributes to hold email hostname, username, and password.

1. Add the authentication token to the request header.
2. Create a credential. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/credentialvault/credentials.

Request body: This example request includes the following required parameters:

- `userProvided`: a boolean value that configures whether the attribute requires a user's input (true) or is standard for all users (false).
- `masked`: a boolean value that configures whether the attribute value is masked with asterisks (true) or is visible to users (false).

```
{
 "name": "Email",
```

```

"attributes": [
 {
 "name": "hostname",
 "userProvided": false,
 "masked": false
 }
]
}

```

3. Send the request.

Response body: In a successful request, this endpoint returns the following data:

- `id`: a unique numeric identifier for the credential.
- `attributes:id`: a unique numeric identifier for attribute.

```

{
 "id": "1630",
 "name": "Email",
 "description": "",
 "ownerId": "1508",
 "attributes": [
 {
 "id": "3335",
 "name": "hostname",
 "description": "",
 "userProvided": false,
 "masked": false,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366448Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 }
],
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366460Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366464Z",
 "version": "0"
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

4. Assign a standard value to the hostname attribute to the credential. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/credentialvault/credentials/{credentialId}/attributevalues.

```

{
 "list": [
 {
 "credentialAttributeId": "3335",
 "value": "mail.example.com"
 }
]
}

```

5. Send the request.

Response body:

```
{
 "list": [
 {
 "id": "1630",
 "credentialAttributeId": "3335",
 "value": "mail.example.com",
 "userId": "1508",
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366460Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366464Z",
 "version": "0"
 }
]
}
```

6. Add the username and password attributes to the Email credential. Use the PUT method and endpoint URL:<your\_control\_room\_url>/v2/credentialvault/credentials/{credentialId}.

Request body: Since you have specified the credential ID in the request URL, it is not required to include the credential ID or name in the request body. In this example request body, the `username` and `password` attributes are configured with values that accept a different input from each user. Additionally, the password attribute is configured to mask the entered value with asterisks.

```
{
 "attributes": [
 {
 "name": "username",
 "userProvided": true,
 "masked": false
 },
 {
 "name": "password",
 "userProvided": true,
 "masked": true
 }
]
}
```

7. Send the request.

Response body: The response body returns the credential with details of the three attributes.

```
{
 "id": "1630",
 "name": "Email",
 "description": "",
 "ownerId": "1508",
 "attributes": [
 {
 "id": "3335",
 "name": "hostname",
 "description": "",
 "userProvided": false,
 "masked": false,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366448Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",

```

```

 "passwordFlag": false
 },
 {
 "id": "3336",
 "name": "username",
 "description": "",
 "userProvided": true,
 "masked": false,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366450Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 },
 {
 "id": "3337",
 "name": "password",
 "description": "",
 "userProvided": true,
 "masked": true,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366450Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 }
],
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366460Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:06:35.366464Z",
 "version": "2"
 }
}

```

If you are following the steps to configure your Credential Vault, do this next: [Assign credential to locker API](#) on page 1208.

## Assign credential to locker API

Add a credential to a locker to enable other users to access the credential to build and run bots.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You must have own, manage, or participate access permissions to the locker.

To assign a credential to a locker, you provide the credential and locker IDs in the URL.

1. Add the authentication token to the request header.
2. Use the PUT method and endpoint URL: `<your_control_room_url>/v2/credentialvault/lockers/{lockerId}/credentials/{credentialId}`.  
Request body: This endpoint does not have a request body.
3. Send the request.

Response body: This endpoint does not return data.

## List credentials using API

Return a list of the credentials for which you are the owner or have access through a locker. If you have the AAE\_Locker Admin role, this endpoint returns all the credentials in the Enterprise Control Room.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You must have access to the credential, either as the credential owner or through a locker.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/credentialvault/credentials.



Note: Append the ?consumed=true parameter to the URL to return a list of credentials that have user-input values and are being used in bots.

Request body: Send an empty request to return all the credentials, sorted in alphabetical order.

```
{
 sort: [
 {
 field: "name",
 direction: "asc"
 }
]
}
```

3. Send the request.

Response body: The response returns the ID of each attribute and the userProvided parameter, which informs whether the value is set by each user (`true`) or is standard for all users (`false`).

```
{
 "page": {
 "offset": 0,
 "total": 1,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "1630",
 "name": "Email",
 "description": "",
 "ownerId": "1508",
 "attributes": [
 {
 "id": "3335",
 "name": "hostname",
 "description": "",
 "userProvided": false,
 "masked": false,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366448Z",

```

```

 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 },
 {
 "id": "3336",
 "name": "username",
 "description": "",
 "userProvided": true,
 "masked": false,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366450Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 },
 {
 "id": "3337",
 "name": "password",
 "description": "",
 "userProvided": true,
 "masked": true,
 "createdBy": "1508",
 "createdOn": "2020-12-28T22:04:41.366450Z",
 "updatedBy": "1508",
 "updatedOn": "2020-12-28T22:04:41.366450Z",
 "version": "0",
 "passwordFlag": false
 }
],
"createdBy": "1508",
"createdOn": "2020-12-28T22:04:41.366460Z",
"updatedBy": "1508",
"updatedOn": "2020-12-28T22:06:35.366464Z",
"version": "2",
"completed": true
}
]
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Now that you have the IDs of attributes that accept a user-input value, next [Assign value to attribute using API](#) on page 1210.

## Assign value to attribute using API

Assign either a standard or user-input value to an attribute, based on your access permissions to the credential. A standard value is accessible by all users of the credential; an attribute with a user-input value enables each user to provide their own value which the other users cannot access.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.

- To set the standard value, you must have access to the credential, either as the credential owner or as a locker Admin or Manager.
- To set the user-input value, you must have access to the credential, either as the credential owner or as a locker consumer.
- Verify whether the attribute accepts a standard or user-input value. This is indicated in the `userProvided` output parameter. [List credentials using API](#) on page 1209.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<your_control_room_url>/credentialvault/credentials/{credentialId}/attributevalues`.

Request body:

```
{
 "list": [
 {
 "credentialAttributeId": "3337",
 "value": "aVerySecurePassword"
 }
]
}
```

3. Send the request.

Response body: The response confirms that a value was stored to the attribute, but for security reasons, the response does not contain the stored value.

```
[
 {
 "id":1630,
 "credentialAttributeId":3337,
 "value":"Szyx93Saw9xnnqF024XHSw==",
 "userId":2273,
 "createdBy":1508,
 "createdOn":"2021-02-03T18:42:33.383970Z",
 "updatedBy":1508,
 "updatedOn":"2021-02-03T18:42:33.383975Z",
 "version":0
 }
]
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

## Deploy bots using API

Use a combination of endpoints to deploy bots from the public workspace to Bot Runner devices.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Prerequisites to deploy a bot

Ensure that you are allocated the following resources:

- View and Run my bots feature permission



- Run and schedule permissions for the folders that contain the bots
- Access to Bot Runner licensed users
- Access to either a default device or a device pool



Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.

## Deploy a bot

1. [Authenticate with username and password API](#) on page 1172
2. [List files and folders by workspace API](#) on page 1250
3. [List available unattended Bot Runners API](#) on page 1215
4. Optional: [List device pools API](#) on page 1217
5. [Deploy bots API](#) on page 1212
6. [Request bot deployment status API](#) on page 1189

### Related concepts

[User management APIs](#) on page 1252

Use `User Management` APIs to create, search, update, or delete roles and users in your Enterprise Control Room.

### Related tasks

[List available unattended Bot Runners API](#) on page 1215

Return a list of available users with unattended Bot Runner licenses. This endpoint returns the user id, which is a numeric value that is used by APIs to identify users.

## Deploy bots API

As a user with a Bot Runner license, deploy bots on your assigned devices. You can also pass variables to bots when they are deployed.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Ensure that you are allocated the following resources:

- View and Run my bots feature permission
- Run and schedule permissions for the folders that contain the bots
- Access to Bot Runner licensed users
- Access to either a default device or a device pool



Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.

To deploy a bot and pass a variable value to the bot, you provide the following information to the API:

| Parameter             | Required | Type    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------|----------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| fileId                | Yes      | Number  | Identifier for the bot to be deployed.<br><a href="#">List files and folders by workspace API</a> on page 1250                                                                                                                                                                                                                                                                                                                                                        |
| runAsUserIds          | Yes      | Number  | Identifier for a user that is registered with your Enterprise Control Room as an Unattended bot runner.<br><a href="#">List available unattended Bot Runners API</a> on page 1215                                                                                                                                                                                                                                                                                     |
| poolIds               | No       | Number  | Identifier of a device pool that has at least one active device.<br> Note: If the user associated with the Bot Runner license has a default device assigned to their account, the bot deploys on that device. If no default device is assigned, or you want to select a different device, then you must specify a device pool.<br><a href="#">List device pools API</a> on page 1217 |
| overrideDefaultDevice | No       | Boolean | If the Bot Runner user is assigned to a default device and you want to use a device pool, set this parameter to <code>true</code> .<br>If deploying to the default device, set this parameter to <code>false</code> .                                                                                                                                                                                                                                                 |
| botInput              | No       | Varies  | Specify the input variable name, value, and data type.                                                                                                                                                                                                                                                                                                                                                                                                                |
| numOfRunAsUsersToUse  | No       | Number  | Specifies how many Bot Runners to use from the list of runAsUserIds. The weighted system algorithm selects the Bot Runners with the least number of queued tasks.                                                                                                                                                                                                                                                                                                     |
| callbackInfo          | No       | Object  | Provides the URL and authentication token for the callback server. After the bot is deployed, the Enterprise Control Room sends the deployment status and output variable values to this callback server.                                                                                                                                                                                                                                                             |

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<your_control_room_url>/v3/automations/deploy`.

Request body:

This example request body specifies the required parameters as well as a value for an input variable.

```
{
 "fileId": 14277,
 "runAsUserIds": [
 2538
],
 "botInput": {
 "sDocHello": {
 "type": "STRING",
 "string": "Hello world, go be great."
 }
 }
}
```

This example request body specifies four runAsUserIds and two numOfRunAsUsersToUse. The weighted algorithm selects the two Bot Runners with the least number of tasks queued at the time of the deploy request.

```
{
```

```

 "fileId": 14277,
 "runAsUserIds": [
 2538,
 4256,
 2213,
 789
],
 "poolIds": [
 27
],
 "numOfRunAsUsersToUse": 2
 }

```

This example request body includes the `overrideDefaultDevice` set to `true`, so the bot will be deployed to the device pool instead of the Run-as user's default device. This example also contains the syntax to specify the callback server URL and provide authorization.

```

{
 "fileId": 14277,
 "runAsUserIds": [
 245
],
 "poolIds": [
 27
],
 "overrideDefaultDevice": true,
 "callbackInfo": {
 "url": "https://callbackserver.com/storeBotExecutionStatus",
 "headers": {
 "X-Authorization": "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiI0Ii"
 }
 }
}

```

### 3. Send the request.

Response body:

When successful, the Bot Deploy API returns a response with the `deploymentId`.

```

{
 "deploymentId": "14c2b6f8-c2a0-4a57-959d-ef413df0d179"
}

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

Perform this task: [Request bot deployment status API](#) on page 1189.

Related tasks

[List available unattended Bot Runners API](#) on page 1215

Return a list of available users with unattended Bot Runner licenses. This endpoint returns the user id, which is a numeric value that is used by APIs to identify users.

[Search for users API](#) on page 1268

Use the `Search for users` API to search for all users in the Enterprise Control Room.

[Create a new user API](#) on page 1263

Use the `Create user` API to create a new user in the Enterprise Control Room.

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

## Device API

Identify all available users with unattended Bot Runner licenses, or filter for users by name.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Return available Bot Runners

Return a list of available users with unattended Bot Runner licenses. This endpoint returns the user id, which is a numeric value that is used by APIs to identify users.

```
POST <control_room_URL>/v1/devices/runasusers/list
```

## List available unattended Bot Runners API

Return a list of available users with unattended Bot Runner licenses. This endpoint returns the user id, which is a numeric value that is used by APIs to identify users.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You must be assigned a custom role that is associated with a Run As user device.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<your_control_room_url>/v1/devices/runasusers/list`.

Request body:

```
{
 "sort": [
 {
 "field": "username",
 "direction": "asc"
 }
],
 "filter": {},
 "fields": [],
 "page": {}
}
```

[Filters in an API request body](#) on page 1308

3. Send the request.

Response body: In a successful request, this endpoint returns the following data:

- `id`: a unique numeric identifier for a user with the Bot Runner license.

- **device**: if the user is configured with a default device, the device name is returned. For example, DESKTOP-DBO6SIE. Otherwise, this parameter returns the message Picked at run time, indicating that a device must be selected from a device pool in order to run a bot.

```
{
 "page":{
 "offset":0,
 "total":6,
 "totalFilter":6
 },
 "list":[
 {
 "id":"9",
 "username":"ubr01_rt",
 "device":"DESKTOP-DBO6SIE",
 "deviceId":"3"
 },
 {
 "id":"10",
 "username":"ubr02_rt",
 "device":"DESKTOP-DBO6SIE",
 "deviceId":"3"
 },
 {
 "id":"11",
 "username":"ubr03_rt",
 "device":"DESKTOP-DBO6SIE",
 "deviceId":"3"
 },
 {
 "id":"12",
 "username":"ubr04_rt",
 "device":"Picked at run time",
 "deviceId":"-1"
 },
 {
 "id":"13",
 "username":"ubr05_rt",
 "device":"Picked at run time",
 "deviceId":"-1"
 },
 {
 "id":"14",
 "username":"ubr06_rt",
 "device":"Picked at run time",
 "deviceId":"-1"
 }
]
}
```

If you are performing the steps to deploy a bot or to create an automation schedule, and the user associated with the Bot Runner license does not have a default device assigned or if you want to select a different device, perform this task: [List device pools API](#) on page 1217.

To deploy a bot that runs on the default device assigned to the Bot Runner user, perform this task: [Deploy bots API](#) on page 1212.

To create an automation schedule with a bot that runs on the default device assigned to the Bot Runner user, perform this task: [Schedule bot to run API](#) on page 1179.

Related tasks

[Deploy bots API](#) on page 1212

As a user with a Bot Runner license, deploy bots on your assigned devices. You can also pass variables to bots when they are deployed.

## Device pool API

Identify all available device pools or filter device pools by name. Retrieve detailed device pool information for a device by searching for its unique numeric identifier (ID).

A device pool is a logical grouping of devices used by a Bot Runner to distribute and manage the running of unattended bots.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

## List device pools API

List all available device pools in your Enterprise Control Room, or filter the list by the name of the device pool.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You must be assigned a role that includes the `View and manage all devices` permission.

This task searches for all device pools that contain the string `finance` in the name.

1. Add the authentication token to the request header.
2. Use the POST and endpoint URL: `<your_control_room_url>/v2/devices/pools/list`.

```
{
 "filter": {
 "operator": "substring",
 "field": "name",
 "value": "finance"
 }
}
```

[Filters in an API request body](#) on page 1308

3. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 15,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "27",
 "name": "finance-device-pool",
 "status": "CONNECTED",

```

```

 "detailedStatus": "ALL_DISCONNECTED",
 "automationCount": "0",
 "ownerIds": [
 "48"
],
 "deviceCount": "3"
 }
]
}

```

A successful response lists one or more device pools. Use the ID of a device pool to view the details.

[Retrieve details of device pool by ID](#) on page 1218

If you are performing the steps to run a bot perform this task: [Deploy bots API](#) on page 1212

If you are performing the steps to create an automation schedule perform this task: [Schedule bot to run API](#) on page 1179

## Retrieve details of device pool by ID

Retrieve the details of a specific device pool by its numeric identifier (ID).



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Ensure you have the following to use this API:

- View and manage ALL device(s): View and manage all the devices, including devices registered by other users.
- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- Device pool id: The unique numeric identifier of the device pool for which you want to retrieve details.

This task searches in the Enterprise Control Room for a specific device pool. The API passes the device pool {id} as part of the URL string. No request body is required.

1. Add the authentication token to the request header.  
[Authentication API](#)
2. Use the GET method and endpoint URL: <your\_control\_room\_url>/v2/devices/pools/{id}.

Enter the device pool ID in the URL.

In this example, the device pool ID is 27.

```
https://<your_control_room_url>/v2/devices/pools/27
```

3. Send the request.

When the request is successful, all the details associated with the passed device pools ID are returned in response body.

In this example, the name, automation scheme, status, Bot Runners, owners, and consumers, associated with the device pool ID 27 are returned in the response body

Response body:

```

{
 "id": "27",
 "name": "finance-device-pool",

```

```

 "description": "Finance department device pool",
 "automationScheme": "ROUND_ROBIN",
 "status": "CONNECTED",
 "timeSlice": "5",
 "timeSliceUnit": "MINUTES",
 "deviceIds": [
 "10",
 "23",
 "41"
],
 "ownerIds": [
 "48"
],
 "consumerIds": [],
 "detailedStatus": "ALL_DISCONNECTED",
 "updatedBy": "48",
 "updatedOn": "2020-04-27T14:29:05.655896Z",
 "createdBy": "48",
 "createdOn": "2020-04-25T10:46:44.642586Z",
 "tenantUuid": "c0a8f10a-717f-130b-8171-7f4762280000",
 "tenantId": "4"
 }

```

Review the details of the listed device pool to determine if it meets your bot deployment requirements. Some of the fields in the response are used as input to other APIs.

Evaluate these details:

|             |                                                                                                                                                                                      |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| id          | The id uniquely identifies this device pool in the Enterprise Control Room. Use this id as input for the poolIds for bot deployment.<br><a href="#">Deploy bots API</a> on page 1212 |
| name        | This is the user-defined name for the device pool. Filter the device pool name using filters in the list device pools task.<br><a href="#">List device pools API</a> on page 1217    |
| deviceIds   | List of the unique numeric IDs for Bot Runner devices that are part of this device pool.                                                                                             |
| ownerIds    | The IDs of the owners of this device pool. Device pool owners can view, edit, or delete the device pool.                                                                             |
| consumerIds | The IDs for users who can view this device while running automations.                                                                                                                |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

## Create device pool API

Device pools are a logical grouping of devices or similar Bot Runner machines on which you can run your workload management automations or scheduled automations. Create a device pool using an API with a unique name and add unattended Bot Runners to the device pool.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.



Ensure you have the following:

- AAE\_Pool\_Admin role and View and manage ALL device(s) permission
- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- Endpoint URLs:
  - <your\_control\_room\_url>/v2/devices/pools
  - <your\_control\_room\_url>/v2/devices/list

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/devices/pools.  
If you want to search or get a list of all the available deviceIds, use the following endpoint URL:  
[https://<your\\_control\\_room\\_url>/v2/devices/list](#)

[Request device details](#) on page 1186

For example:

```
POST https://192.0.2.0/v2/devices/pools
```

The this example request body enables you to add automation scheme, unattended Bot Runners, owners, and consumers in the device pool.

Request body:

```
{
 "name": "Finance-device-pool",
 "description": "Pool for Finance RPA",
 "deviceIds": [
 "1",
 "10"
],
 "automationScheme": "ROUND_ROBIN",
 "ownerIds": [
 "1",
 "24",
 "26"
],
 "consumerIds": [
 "21",
 "22"
]
}
```

3. Send the request.

When the request is successful, a unique device pool id is returned in the response body. The details of the devices, owners, and consumers associated with the device pool are also provided.

In this example, the response body returns the unique device pool id as 4.

Response body:

```
{
 "id": "4",
 "name": "Finance-device-pool",
 "description": "Pool for Finance RPA",
 "automationScheme": "ROUND_ROBIN",
 "status": "CONNECTED",
 "timeSlice": "5",
 "timeSliceUnit": "MINUTES",
```

```

 "deviceIds": [
 "1",
 "10"
],
 "ownerIds": [
 "1",
 "24",
 "26"
],
 "consumerIds": [
],
 "detailedStatus": "SOME_CONNECTED",
 "updatedBy": "24",
 "updatedOn": "2020-05-26T09:26:54.556280800Z",
 "createdBy": "24",
 "createdOn": "2020-05-26T09:26:54.556280800Z",
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c",
 "tenantId": "4"
 }

```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

If you are performing the steps to [Create workload automation](#) on page 1290, next [Run bot with queue API](#) on page 1299.

If you are performing the steps to [Deploy a bot](#) on page 1212, next [Deploy bots API](#) on page 1212.

## License API

The License API contains endpoints to retrieve Enterprise Control Room license details (such as expiration date and license mode) and manually sync the Enterprise Control Room with the license server after license reallocation or renewal.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Manage licenses

1. [Authenticate the user](#).  
Use the POST method to generate an authentication JSON Web Token.
2. [Retrieve Enterprise Control Room license details API](#) on page 1222.  
Retrieve details of the Enterprise Control Room license, including license type, expiration date, Fail-Safe status, and license server sync status.
3. If the `controlRoomLicenseServerSyncStatus` parameter returns `False`, use the Sync endpoint to update the license allocations and expiration date from the license server.

### List the license allocations

1. [Authenticate the user](#).

Use the POST method to generate an authentication JSON Web Token.

2. If the license is cloud-based: If new licenses were purchased, or if licenses were reallocated between Enterprise Control Room instances, use the Sync endpoint to update the license allocations and expiration date from the license server.
3. [List details of the Enterprise Control Room licenses](#) on page 1223

Retrieve Enterprise Control Room metadata including the license type, number of available licenses, number of licenses used in a specific Enterprise Control Room instance, and number of licenses used in all Enterprise Control Room instances.

Related reference

[Enterprise A2019 licenses](#) on page 392

The All Licenses page displays detailed information about current product and device licenses.

## Retrieve Enterprise Control Room license details API

Retrieve details of the Enterprise Control Room license, including license type, expiration date, Fail-Safe status, and license server sync status.

1. Use the GET method and endpoint URL: `<your_control_room_url>/v2/license/details`.
2. Send the request.

Response body: In a successful request, this endpoint returns the following data:

- `failSafeStatus`: A numerical value that represents the Fail-Safe status of the Cloud Control Room. Values: 0 means the Enterprise Control Room is connected, 1 means the Enterprise Control Room is in Fail-Safe mode, and 2 means the Fail-Safe status has expired.

If the Enterprise Control Room was configured with a file license, the returned value is always 0.

[Enterprise Control Room Fail-Safe status](#) on page 391

- `controlRoomLicenseServerSyncStatus`: A Boolean value that determines whether the license allocations in this Enterprise Control Room are in sync with the license server.
- `licenseMode`: Whether the Enterprise Control Room license was configured from a file or through a connection with the license server.

[Entitlement models](#) on page 393

In this first example response, the `licenseMode` confirms that the Enterprise Control Room is on a file-based license, thus the `failSafeStatus` is 0 and no value is returned for the `installedCrId`.

```
{
 "type": "PURCHASED",
 "installationDate": "2020-09-09T15:06:05.211Z",
 "expirationDate": "2021-06-30T18:29:59.999Z",
 "failSafeStatus": 0,
 "controlRoomLicenseServerSyncStatus": true,
 "installedCrId": "",
 "licenseMode": "FileLicense"
}
```

In the second example response, the `licenseMode` confirms that the Enterprise Control Room is on a cloud-based license, the `failSafeStatus` has returned 1, which means that requests to other Enterprise Control Room APIs will fail until the connection with the license server is reestablished, and the `controlRoomLicenseServerSyncStatus` has returned false.

```
{
 "type": "PURCHASED",
```

```

 "installationDate": "2020-09-14T18:30:00Z",
 "expirationDate": "2021-04-27T18:30:00Z",
 "failSafeStatus": 1,
 "controlRoomLicenseServerSyncStatus": false,
 "installedCrId": "b96edac7-b7e3-57bf-b857-ad14ac754674",
 "licenseMode": "CloudLicense"
 }

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

If the `controlRoomLicenseServerSyncStatus` parameter returns `False`, use the Sync endpoint to update the license allocations and expiration date from the license server.

## List details of the Enterprise Control Room licenses

Retrieve Enterprise Control Room metadata including the license type, number of available licenses, number of licenses used in a specific Enterprise Control Room instance, and number of licenses used in all Enterprise Control Room instances.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<your_control_room_url>/v2/license/product/list`.

Request body: Leave the body empty to retrieve a list of all the licenses.

```
{ }
```

3. Send the request.

Response body: In a successful request, this endpoint returns the following data:

- `name`: Returns the product license name, such as `ControlRoom`, `Analytics`, `BotFarm`, `Cognitive`, `DiscoveryBot`, and `AutomationAnywhereRoboticInterface`.
- `feature name`: Returns the device license, such as `Development for Bot Creator`, `Runtime for unattended Bot Runner`, and `AttendedRuntime` for attended Bot Runner licenses.
- `Enable`: Whether the license is enabled. If the returned value is `False`, that license cannot be assigned to a user.
- `PurchasedCount`: The total number of licenses the customer purchased.
- `usedCountByThisCr`: The number of licenses used in this Enterprise Control Room instance.
- `usedCountByAllCr`: The total number of licenses that are used. If the license is file-based, this number matches the number in the `usedCountByThisCr` parameter. If the license is cloud-based, this parameter returns the total number of licenses used in all of the customer's Enterprise Control Room instances.
- `availableCount`: The number of licenses that are available for allocation.
- `licenseType`: Whether the license was purchased or is a trial license.

[Enterprise A2019 licenses](#) on page 392

In this code example (truncated), the product name is `ControlRoom`, which means the license is for the Enterprise A2019 product. The feature name is `Development`, indicating that the data is for the Bot Creator device license.

```
{
 "page": {
 "offset": 0,
 "total": 10,
 "totalFilter": 10
 },
 "list": [
 {
 "id": 1,
 "name": "ControlRoom",
 "feature": {
 "id": 1,
 "name": "Development",
 "enable": true,
 "purchasedCount": 5000,
 "usedCountByThisCr": 133,
 "usedCountByAllCr": 133,
 "availableCount": 4867,
 "licenseCountUnit": "NUMBER"
 },
 "licenseType": "PURCHASED"
 }
]
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Migration APIs

Use migration APIs to migrate MetaBots and TaskBots that were created in Enterprise client versions 11.x and 10.x to A2019. Use this page to review the migration prerequisites and access 11.x and 10.x Migration APIs.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Prerequisites

Complete the prerequisites before migrating 11.x bots to A2019. [Prerequisite tasks for migrating bots](#) on page 495

### 11.x Migration APIs

1. [Start migration API](#) on page 1225
2. [Migrate all bots in a sub-folder API](#) on page 1226
3. [List migration results API](#) on page 1227
4. [Bot migration results by id API](#) on page 1229
5. [Migration action mapping results API](#) on page 1230

## 10.x Migration APIs

1. [Connect to 10.x database](#) on page 1233
2. [Validate master key and repository path](#) on page 1234
3. [Initiate 10.x data migration process](#) on page 1235

(Optional) Use any the following APIs to retrieve the migration results.

- [Retrieve migrated roles](#) on page 1236
- [Retrieve migrated users](#) on page 1238
- [Retrieve migrated credentials](#) on page 1240
- [Retrieve migrated bots](#) on page 1241
- [Retrieve migrated schedules](#) on page 1243

## Start migration API

Use this API to migrate bots (TaskBots and MetaBots) created using the Enterprise client version 11.x to A2019.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

Complete the prerequisites before migrating 11.x bots to A2019. [Prerequisite tasks for migrating bots](#) on page 495

Request parameters:

| Parameter     | Required | Type    | Description                                                                                              |
|---------------|----------|---------|----------------------------------------------------------------------------------------------------------|
| name          | Yes      | String  | The name for the migration entity.                                                                       |
| description   | No       | String  | A short description for the migration.                                                                   |
| botIds        | Yes      | integer | Bot IDs to run the migration.                                                                            |
| userIds       | Yes      | Integer | Bot Runner users IDs where this migration would be run on.                                               |
| overwriteBots | No       | Integer | Set this parameter to true if you want to migrate the already migrate again. The default value is false. |

1. Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/migration/start.

This request migrates a single bot with the botIds of 74, and the userIds of 18.

Request body:

```
{
 "name": "Docs Test Migration",
 "description": "docs test",
 "overwriteBots": true,
 "botIds": [
 74
],
 "userIds": [
```

```

 18
]
}
```

3. Send the request.  
Response body:

```
{ }
```

The successful response includes a 200 success response and an empty body.

You can also migrate all the bots from a sub-folder.

[Migrate all bots in a sub-folder API](#) on page 1226

Migrate all the bots separately as well as from a given folder and all if its sub-folders in your Enterprise Control Room repository.

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

View the migration status using the [List migration results API](#) on page 1227.

## Migrate all bots in a sub-folder API

Migrate all the bots separately as well as from a given folder and all if its sub-folders in your Enterprise Control Room repository.

- Find the folder ID you want to migrate. The [List files and folders by workspace API](#) on page 1250 searches for files and folders in the private or public Enterprise Control Room repositories. Filter the results to identify the folder ids to be used in the request body.
- For one or more users with a RUNTIME device license. Use `userIds` for registered users in the Enterprise Control Room as unattended bot runners with a RUNTIME device license and registered device. [Search for users API](#) on page 1268
- You must have an admin role to migrate bots and folders.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<your_control_room_url>/v3/migration/start`

Request parameters:

| Parameter           | Required | Type    | Description                                                                                           |
|---------------------|----------|---------|-------------------------------------------------------------------------------------------------------|
| folderIds           | Yes      | Integer | Folder IDs for all the bots contained in the sub-folder with t                                        |
| userIds             | Yes      | Integer | User IDs for an unattended Bot Runner user.                                                           |
| includeChildFolders | No       | Boolean | Set this parameter to true if you want to include child folder migration. The default value is false. |

This following request starts a migration for all the bots contained in the sub-folder with the folderIds: 7 and userIds: 18.

Request body:

```

{
 "name": "Follow a convention that is meaningful and easy to search.",
 "description": "Add a meaningful description.",
 "overwriteBots": true,
```

```

 "userIds": [
 18
],
 "folderIds": [
 7
],
 "includeChildFolders": true
 }

```

3. Send the request.

The successful response includes a 200 success code and an empty body.

```
{ }
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

You can view the status of the migration using the [List migration results API](#) on page 1227 API.

## List migration results API

List the overall migration results for each migration you run. Filter by selected fields to get the specific results.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

You must have an admin role or a custom role with View Migration permission.

Supported filterable fields: Use the following filters in the request body to narrow the results.

- name: The migration name.
  - status: The migration status.
    - Success
    - Skipped
    - Failed
  - migrationType: The migration type: BOT, ROLE, or AUDIT\_DATA.
1. Add the authentication token to the request header.
  2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/migration/list.  
Request body:

This request searches for migrations that contain the word HRBotMigration in the name field that was started between the specified dates.

```

{
 "sort": [
 {
 "field": "startTime",
 "direction": "desc"
 }
],
 "filter": {
 "operator": "substring",
 "value": "HRBotMigration",
 "field": "name"
 }
}

```



```

 },
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
 }
}

```

3. Send the request.

Response body:

The example response returned the migration name, startTime and endTime, migration status, migrationType and other details.

```

{
 "page": {
 "offset": 0,
 "total": 17,
 "totalFilter": 1
 },
 "list": [
 {
 "id": 3,
 "name": " HRBotMigration ",
 "startTime": "2021-01-20T14:26:27.347Z",
 "endTime": "2021-01-20T14:27:36.617Z",
 "createdBy": 1,
 "duration": "69s",
 "numSuccess": 1,
 "numFailed": 0,
 "numSkipped": 0,
 "numTotal": 1,
 "status": "SUCCESSFUL",
 "updatedOn": "2021-01-20T14:26:47.850Z",
 "updatedBy": 1,
 "durationMillis": 69270,
 "migrationType": "BOT"
 }
]
}

```



Note: There are some response fields that are not used for 11.x migration:

- duration: A legacy field that is no longer used for migration.
- migrationType: It is used for 10.x migrations only. It is not used for 11.x migration.

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

To view details about a specific migration, enter a specific migration id in the [Bot migration results by id API](#) on page 1229.

## Bot migration results by id API

List bot migration results by a unique numeric identifier, migrationId and filter the results by selected fields.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- You must have an admin role or a custom role with View Migration permission.
- Use the numeric identifier, migrationId for the migration you want to view.

Supported filterable fields:

Use the following filters in the request body to narrow the search results:

- sourceName: Source bot name.
- sourceType: Source bot type.
- status: Migration status.
  - Success
  - Skipped
  - Failed
- reason: A reason why this bot migration is failed.
- targetName: Migrated bot target name.
- targetType: Migrated bot target type.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/migration/<migrationId>/results/list  
Enter the migration ID you want to view.
3. Create a request to find the search results. This filter searches for a string in the sourceName of the migrated bot.

Request body:

```
{
 "sort": [
 {
 "field": "sourceName",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "substring",
 "value": "mbot-dep",
 "field": "sourceName"
 },
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 3,
 "totalFilter": 1
 },
 "list": [
 {
 "sourceId": 24,
 "sourceName": "mbot-dep01.mbot",
 "sourcePath": "Automation Anywhere\\Bots\\My MetaBots\\mbot-
dep01.mbot",
 "sourceType": "application/vnd.aa.mbot",
 "targetId": 941,
 "status": "SUCCESS",
 "reason": "",
 "selectedByUser": true,
 "userId": 9,
 "id": 469,
 "targetName": "logic-launchweb01",
 "targetPath": "Automation Anywhere\\Bots\\My MetaBots\\mbot-
dep01\\logic-launchweb01",
 "targetType": "application/vnd.aa.taskbot"
 }
]
}
```

The response returned 1 out of 3 responses for bot migration results.

add link to the next API Migration Action mapping results.

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

To view the list action mapping results, see [Migration action mapping results API](#) on page 1230.

## Migration action mapping results API

List action mapping results for bots by unique numeric identifiers for the migration {id} and the journal {journalid}, and then filter the results by selected fields.

- You must have an admin role or a custom role with View migration permission.
- The numeric identifier, {id}, for the migration you want to view.
- The numeric value for the {journalid} associated with the migration identifier. See [How to find a migration journalid](#) on page 1231

Supported filterable fields:

Use the following filters in the request body to narrow the search results:

- targetAction: Target action of the migrated bot.
- reason: The reason why this action migration is failed.

1. Add the authentication token to the request header.
2. In the request URL, enter the migration and journal IDs.

3. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/migration/{id}/journal/{journalid}/actionmappings/list

This request searches for action mappings that contain the word not yet supported in the reason.

Request body

```
{
 "sort": [
 {
 "field": "targetLineNumber",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "substring",
 "value": "not yet supported",
 "field": "reason"
 },
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 10,
 "totalFilter": 1
 },
 "list": [
 {
 "targetLineNumber": 1,
 "targetAction": "runTask",
 "isReviewRequired": true,
 "reason": "1. The \"Run Task\" bot path defined with
variables is not yet supported.",
 "remarks": "",
 "id": 6,
 "sourceLineNumber": 0,
 "sourceAction": ""
 }
]
}
```

The response for this request returned 1 of 10 migration action mappings results.

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

## How to find a migration journalid

Migrations can have more than one journalid. You can find the journalid in the response of a results list for a specific migration id.

In this request, we searched for results for the migration with the id 16.

```
<your_control_room_url>/v3/migration/16/results/list
```

The request returned the id in each object list as the journalid. In this example, there are two journal identifiers, 30 and 31, for the migration id 16.

```
{
 "page": {
 "offset": 0,
 "total": 2,
 "totalFilter": 2
 },
 "list": [
 {
 "sourceId": 12,
 "sourceName": "Dependency of IGN-23437.mbot",
 "sourcePath": "Automation Anywhere\\Bots\\My MetaBots\\
\\Dependency of IGN-23437.mbot",
 "sourceType": "application/vnd.aa.mbot",
 "targetId": 0,
 "status": "FAILED",
 "reason": "The logic IGN-23437 has some commands or actions
which are not yet supported for migration.",
 "selectedByUser": true,
 "userId": 9,
 "id": 30,
 "targetName": "",
 "targetPath": "",
 "targetType": ""
 },
 {
 "sourceId": 12,
 "sourceName": "Dependency of IGN-23437.mbot",
 "sourcePath": "Automation Anywhere\\Bots\\My MetaBots\\
\\Dependency of IGN-23437.mbot",
 "sourceType": "application/vnd.aa.mbot",
 "targetId": 0,
 "status": "FAILED",
 "reason": "Migration of MetaBot failed.",
 "selectedByUser": false,
 "userId": 9,
 "id": 31,
 "targetName": "",
 "targetPath": "",
 "targetType": ""
 }
]
}
```

You can use the migration id and journal id in an action mapping request.

```
<your_control_room_url>/v3/migration/16/journal/31/actionmappings/list
```

## 10.x Migration APIs

Use migration APIs to migrate MetaBots and TaskBots that were created in Enterprise client version 10.x to A2019. With these APIs, you can connect to the 10.x Enterprise Control Room database, validate the master key and the repository path, and then start copying the 10.x data to Enterprise A2019.

- Complete the prerequisites before migrating 10.x bots to A2019. See [Prerequisite tasks for migrating bots](#) on page 495.
- You must have an admin role or the Manage Migration permission to validate connection parameters, connect to the 10.x database, and start 10.x migration process. If you want to retrieve a list of roles, users, credentials, and schedules, you need an admin role or the View Migration permission.
- Execute the following three APIs in order they are listed below. You can retrieve roles, users, credentials, bots, or schedules after you executed the mandatory APIs.

### Connect to 10.x database

Use this API to connect to the 10.x Enterprise Control Room database from which you can copy the data to A2019.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Review the prerequisites before migrating bots to A2019.  
[Prerequisite tasks for migrating bots](#) on page 495
  - You must have an admin role or a custom role with Manage Migration permission to validate connection parameters and connect to the 10.x database.
1. Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
  2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/migration/connection  
Request body:

```
{
 "host": "10.000.000.000",
 "port": 1433,
 "databaseName": "CRDB",
 "username": "Admin",
 "password": "<password>",
 "integratedSecurity": false,
 "encrypt": false
}
```

Request parameters:

| Parameter    | Required | Type    | Description                                  |
|--------------|----------|---------|----------------------------------------------|
| host         | Yes      | String  | SQL server host name or IP address           |
| port         | Yes      | Integer | SQL server port number                       |
| databaseName | Yes      | String  | Source Enterprise Control Room database name |
| userName     | Yes      | String  | A user name to connect to the database       |
| password     | Yes      | String  | Password to connect to the database          |

| Parameter          | Required | Type    | Description                                                                                                              |
|--------------------|----------|---------|--------------------------------------------------------------------------------------------------------------------------|
| integratedSecurity | Yes      | Boolean | Set this to <code>true</code> if you want use Windows authentication value is <code>false</code> .                       |
| encrypt            | Yes      | Boolean | Set this to <code>true</code> if you want to use a secure connection database. The default value is <code>false</code> . |

- Send the request.

Response body:

It returns a success response code and an empty string.

```
{ }
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

[Validate master key and repository path](#) on page 1234

## Validate master key and repository path

Use this API to validate the Credential Vault master key and the repository path.

- You must have an admin role or a custom role with Manage Migration permission to validate the master key and the repository path.
- Complete this step [Connect to 10.x database](#) on page 1233 before executing this API.

- Add the authentication token to the request header.
- Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/migration/masterkey

Request body:

```
{
 "privateKey": "<CV master key value>",
 "repoPath": "C:\\Migration\\10X\\A2019.14\\Automation Anywhere Server Files"
}
```

If you are not able to get a response, add an additional backslash in the repoPath or use a single forward slash.

Request parameters:

| Parameter  | Required | Type   | Description                                                                                                                     |
|------------|----------|--------|---------------------------------------------------------------------------------------------------------------------------------|
| privateKey | Yes      | String | The master key to connect to 10.x Credential Vault.<br>This is available for configuration during the initial Enterprise setup. |
| repoPath   | Yes      | String | The shared repository path where the Enterprise Control Room repository is located.                                             |

- Send the request.

Response body:

It returns a success response code and an empty string.

```
{ }
```

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### Initiate the 10.x data migration process

#### Initiate 10.x data migration process

Use this API to start the 10.x data migration.

- You must have an admin role or a custom role with Manage Migration permission to start the 10.x data migration.
- Complete this step [Validate master key and repository path](#) on page 1234 before executing this API.

- Add the authentication token to the request header.
- Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/migration/start  
Request body:

```
{
 "name": "Migration-10x-001",
 "description": "10x bot migration to A2019 001"
}
```

Request parameters:

| Parameter   | Required | Type   | Description                            |
|-------------|----------|--------|----------------------------------------|
| name        | Yes      | String | The name for the migration entity.     |
| description | No       | String | A short description for the migration. |

- Send the request.

Response body:

```
{
 "id": "1",
 "name": "Migration-10x-001",
 "createdBy": "10",
 "migrationType": "ROLE",
 "entities": []
}
```

Response parameters:

| Parameter | Description                                                 |
|-----------|-------------------------------------------------------------|
| id        | The migration ID<br>This is used for internal purpose only. |
| name      | The migration name.                                         |
| createdBy | ID of the user who has initiated this migration.            |



| Parameter     | Description                                                                             |
|---------------|-----------------------------------------------------------------------------------------|
| migrationType | Indicates the data migration type: Role or Bot<br>This is used for 10.x migration only. |
| entities      | List of migration entities.                                                             |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### [Retrieve a list of migration roles](#)

## Retrieve migrated roles

Use this API to retrieve 10.x roles that are copied to the A2019 database.

You must have an admin role or a custom role with View Migration permission to retrieve migrated roles.

1. Add the authentication token to the request header.
2. Use the ID from the API response body as the migrationId.  
See [Initiate 10.x data migration process](#) on page 1235.
3. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/migration/{migrationId}/roles/list

Request body:

```
{
 "sort": [],
 "filter": {},
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

Request parameters:

| Parameter   | Required | Type    | Description                               |
|-------------|----------|---------|-------------------------------------------|
| sort        | No       | String  | Sort directions                           |
| filter      | No       | String  | Filter rules                              |
| fields      | No       | String  | Filter fields                             |
| page        | Yes      | Integer | Pagination rules                          |
| offset      | Yes      | Integer | Page starting index                       |
| total       | No       | Integer | Total number of items                     |
| totalFilter | No       | Integer | Total number of items matching the filter |
| length      | Yes      | Integer | Number of items to be returned            |

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 9,
 "totalFilter": 9
 },
 "list": [
 {
 "id": 1,
 "type": "ROLE",
 "sourceId": "1",
 "targetId": 1,
 "name": "Admin",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 },
 {
 "id": 2,
 "type": "ROLE",
 "sourceId": "2",
 "targetId": 2,
 "name": "Basic",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 },

 {
 "id": 9,
 "type": "ROLE",
 "sourceId": "9",
 "targetId": 24,
 "name": "Admin_Role01",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 }
]
}
```

Response parameters:

| Parameter | Description                                                        |
|-----------|--------------------------------------------------------------------|
| list      | List of roles.                                                     |
| id        | The role ID.<br>This ID is used for UI purposes only.              |
| type      | The migration type.                                                |
| sourceId  | The source (database) role ID.                                     |
| targetId  | The migrated role ID.                                              |
| name      | A role name.                                                       |
| status    | The migration status<br>Valid values: Success, Skipped, or Failed. |

| Parameter  | Description                                                                     |
|------------|---------------------------------------------------------------------------------|
| reason     | The reason why the migration failed.                                            |
| targetPath | The migrated bot file location.<br>It is only applicable for the bot migration. |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### Retrieve a list of migrated users

## Retrieve migrated users

Use this API to retrieve 10.x database users that are copied to the A2019 database.

You must have an admin role or a custom role with View Migration permission to retrieve migrated users.

1. Add the authentication token to the request header.
2. Use the ID from the API response as the migrationId.  
See [Initiate 10.x data migration process](#) on page 1235.
3. Use the POST method and endpoint URL:<your\_control\_room\_url>/v2/migration/{migrationId}/users/list

Request body:

```
{
 "sort": [],
 "filter": {},
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

Request parameters:

| Parameter   | Required | Type    | Description                           |
|-------------|----------|---------|---------------------------------------|
| sort        | No       | String  | Sort directions                       |
| filter      | No       | String  | Filter rules                          |
| fields      | No       | String  | Filter fields                         |
| page        | Yes      | Integer | Pagination rules                      |
| offset      | Yes      | Integer | Page starting index                   |
| total       | No       | Integer | Total number of items                 |
| totalFilter | No       | Integer | Total number of items matching filter |
| length      | Yes      | Integer | Number of items to be returned        |

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 5,
 "totalFilter": 5
 },
 "list": [
 {
 "id": 10,
 "type": "USER",
 "sourceId": "1",
 "targetId": 11,
 "name": "admin_1",
 "status": "SUCCESS",
 "reason": "The user admin has been renamed to admin_1 as the user
with same name already exists",
 "targetPath": ""
 },

 {
 "id": 14,
 "type": "USER",
 "sourceId": "5",
 "targetId": 15,
 "name": "admin10503",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 }
]
}
```

Response parameters:

| Parameter  | Description                                                                |
|------------|----------------------------------------------------------------------------|
| list       | List of users                                                              |
| id         | The user ID<br>It is used for UI purpose only.                             |
| type       | The migration type                                                         |
| sourceId   | The source (database) user ID                                              |
| targetId   | The migrated user ID                                                       |
| name       | A user name                                                                |
| status     | The migration status<br>Valid values: Success, Skipped, or Failed.         |
| reason     | The reason why the migration failed.                                       |
| targetPath | The migrated bot file location<br>It is only applicable for bot migration. |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### Retrieve a list of migrated credentials

## Retrieve migrated credentials

Use this API to retrieve 10.x database credentials that are copied to the A2019 database.

You must have an admin role or a custom role with View Migration permission to retrieve migrated credentials.

1. Add the authentication token to the request header. Use the HTTP request syntax (URL):
2. Use the ID from the API response body as the migrationId.  
See [Initiate 10.x data migration process](#) on page 1235.
3. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/migration/{migrationId}/credentials/list

Request body:

```
{
 "sort": [],
 "filter": {},
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

Request parameters:

| Parameter   | Required | Type    | Description                               |
|-------------|----------|---------|-------------------------------------------|
| sort        | No       | String  | Sort directions                           |
| filter      | No       | String  | Filter rules                              |
| fields      | No       | String  | Filter fields                             |
| page        | No       | Integer | Pagination rules                          |
| offset      | Yes      | Integer | Page starting index                       |
| total       | No       | Integer | Total number of items                     |
| totalFilter | No       | Integer | Total number of items matching the filter |
| length      | Yes      | Integer | Number of items to be returned            |

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 2,
 "totalFilter": 2
 },
 "list": [
```

```

{
 "id": 15,
 "type": "CREDENTIAL",
 "sourceId": "4",
 "targetId": 2,
 "name": "admin10501 - Email Settings",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
},
{
 "id": 16,
 "type": "CREDENTIAL",
 "sourceId": "5",
 "targetId": 2,
 "name": "admin10502 - Email Settings",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
}
]
}

```

Response parameters:

| Parameter  | Description                                                                    |
|------------|--------------------------------------------------------------------------------|
| list       | List of credentials                                                            |
| id         | The credential ID                                                              |
| type       | The migration type                                                             |
| sourceId   | The source (database) credential ID                                            |
| targetId   | The migrated credential ID                                                     |
| name       | A credential name                                                              |
| status     | The migration status<br>Valid values: Success, Skipped, or Failed.             |
| reason     | The reason why the migration failed                                            |
| targetPath | The migrated bot file location<br>It is only applicable for the bot migration. |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### Retrieve a list of migrated bots

#### Retrieve migrated bots

Use this API to retrieve a list of 10.x migrated bots that are copied to the A2019 database.

You must have an admin role or a custom role with View Migration permission to retrieve migrated bots.

1. Add the authentication token to the request header. Use the HTTP request syntax (URL):
2. Use the ID from the API response body as the migrationId.

See [Initiate 10.x data migration process](#) on page 1235.

- Use the POST method and endpoint URL:<your\_control\_room\_url>/v2/migration/{migrationId}/bots/list

Request body:

```
{
 "sort": [],
 "filter": {},
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

Request parameters:

| Parameter   | Required | Type    | Description                               |
|-------------|----------|---------|-------------------------------------------|
| sort        | No       | String  | Sort directions                           |
| filter      | No       | String  | Filter rules                              |
| fields      | No       | String  | Filter fields                             |
| page        | No       | Integer | Pagination rules                          |
| offset      | Yes      | Integer | Page starting index                       |
| total       | No       | Integer | Total number of items                     |
| totalFilter | No       | Integer | Total number of items matching the filter |
| length      | Yes      | Integer | Number of items to be returned            |

- Send the request.Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 1004,
 "totalFilter": 1004
 },
 "list": [
 {
 "id": 17,
 "type": "BOT",
 "sourceId": "186",
 "targetId": 15,
 "name": "DelayLoop - Copy (129).atmx",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": "Automation Anywhere\\Bots\\My Tasks\\Migration
Extra"
 },
 {
 "id": 18,
 "type": "BOT",
 "sourceId": "438",
```

```

 "targetId": 17,
 "name": "DelayLoop - Copy (115).atmx",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": "Automation Anywhere\\Bots\\My Tasks\\Migration Extra
\\RM-APIAutomation"
 },

 {
 "id": 216,
 "type": "BOT",
 "sourceId": "703",
 "targetId": 221,
 "name": "DelayLoop - Copy (132).atmx",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": "Automation Anywhere\\Bots\\My Tasks"
 }
]
}

```

Response parameters:

| Parameter  | Description                                                        |
|------------|--------------------------------------------------------------------|
| list       | List of bots                                                       |
| id         | The bot ID                                                         |
| type       | The migration type                                                 |
| sourceId   | The source (database) bot ID                                       |
| targetId   | The migrated bot ID                                                |
| name       | The bot name                                                       |
| status     | The migration status<br>Valid values: Success, Skipped, or Failed. |
| reason     | The reason why the migration failed                                |
| targetPath | The migrated bot file location                                     |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

### [Retrieve a list of migrated schedules](#)

## Retrieve migrated schedules

Use this API to retrieve a list of 10.x migrated schedules that are copied to the A2019 database.

You must have an admin role or a custom role with View Migration permission to retrieve migrated schedules.

1. Add the authentication token to the request header.
2. Use the ID from the API response body as the migrationId .

See [Initiate 10.x data migration process](#) on page 1235.



3. Use the POST method and endpoint URL:<your\_control\_room\_url>/v2/migration/{migrationId}/schedules/list

Request body:

```
{
 "sort": [],
 "filter": {},
 "fields": [],
 "page": {
 "offset": 0,
 "total": 100,
 "totalFilter": 100,
 "length": 200
 }
}
```

Request parameters:

| Parameter   | Required | Type    | Description                               |
|-------------|----------|---------|-------------------------------------------|
| sort        | No       | String  | Sort directions                           |
| filter      | No       | String  | Filter rules                              |
| fields      | No       | String  | Filter fields                             |
| page        | No       | Integer | Pagination rules                          |
| offset      | Yes      | Integer | Page starting index                       |
| total       | No       | Integer | Total number of items                     |
| totalFilter | No       | Integer | Total number of items matching the filter |
| length      | Yes      | Integer | Number of items to be returned            |

4. Send the request.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 7,
 "totalFilter": 7
 },
 "list": [
 {
 "id": 1173,
 "type": "SCHEDULE",
 "sourceId": "3",
 "targetId": 2,
 "name": "Monthly",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 },
 {
 "id": 1174,
 "type": "SCHEDULE",
 "sourceId": "5",
 "targetId": 3,
 "name": "alternatemonths",
 "status": "SUCCESS",

```

```

 "reason": "",
 "targetPath": ""
 },

 {
 "id": 1179,
 "type": "SCHEDULE",
 "sourceId": "15",
 "targetId": 8,
 "name": "none",
 "status": "SUCCESS",
 "reason": "",
 "targetPath": ""
 }
]
}

```

Response parameters:

| Parameter  | Description                                                                    |
|------------|--------------------------------------------------------------------------------|
| list       | List of schedules                                                              |
| id         | The schedule ID                                                                |
| type       | The migration type                                                             |
| sourceId   | The source (database) schedule ID                                              |
| targetId   | The migrated schedule ID                                                       |
| name       | The schedule name                                                              |
| status     | The migration status<br>Valid values: Success, Skipped, or Failed.             |
| reason     | The reason why the migration failed                                            |
| targetPath | The migrated bot file location<br>It is only applicable for the bot migration. |

The REST API responds to each request with an HTTP response code. For response codes, see [API response codes](#) on page 1314.

## Repository Management APIs

Use the Repository Management APIs to return information on or to delete the objects (bots, folders, and files) that you have permissions to access in the Enterprise Control Room.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

The Enterprise A2019 repository is comprised of the private and public workspaces, which contain folders of bots (.atmx) and their dependency files. The private workspace holds objects that are only accessible to the logged-in user. Bots in the private workspace can only be run on that user's device. The public workspace holds objects that are accessible to all users who have the necessary permissions.

When a bot is checked-in from a private workspace to the public workspace, it can be checked out by another user to their private workspace for editing or deployed to a Bot Runner.



Note:

- To view objects in your private workspace, you must have a Bot Creator license and a role that includes the `view my bots` feature permission.
- To view objects in the public workspace, you must be assigned a role that includes the `view my bots` feature permission and the `view content bot` permission to folders in the public workspace.

## Choosing a Repository Management list API

The following Repository Management APIs return information on objects (bots, files, and folders), based on the access granted by the user's role.

- `/file/list` returns details on all the objects for which you have access permissions.  
[List details about files, folders, and bots API](#) on page 1247
- `/folders/{folderid}/list` returns details on only the objects in a specific folder.  
[List files and folders in a specific folder API](#) on page 1248
- `/workspaces/{workspaceType}/files/list` returns details on only the objects in either the public or private workspace.  
[List files and folders by workspace API](#) on page 1250

## Supported filterable fields

Use the following filters in the request bodies of the list APIs to narrow down the response data.

`createdBy`

The numeric identifier for the user who created a folder or bot.

```
{
 "operator": "eq",
 "field": "createdBy",
 "value": "2587"
}
```

`folder`

This example searches for only folders. Set the value to `false` to search for only bots and files.

```
{
 "operator": "eq",
 "field": "folder",
 "value": "true"
}
```

`name`

This example searches for objects that are named Finance or finance. This search is not case-sensitive.

- Field: name

- Type: string

```
{
 "filter": {
 "operator": "eq",
 "value": "finance",
 "field": "name"
 }
}
```

path

This example searches for objects that contain the string Finance in the path parameter. This search is not case-sensitive.

- Field: path
- Type: string

```
{
 "filter": {
 "operator": "substring",
 "value": "Finance",
 "field": "path"
 }
}
```

Related concepts

[Bot permissions for a role](#) on page 1119

Assign bot permissions when creating a role with the View my bots feature permission.

## List details about files, folders, and bots API

Return details about all the objects (bots, folders, and files) in the Enterprise Control Room. This endpoint returns the object id, which is a numeric value that is used in other APIs to identify the file, folder or bot.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- To view objects in your private workspace, you must have a Bot Creator license and a role that includes the `View my bots` feature permission.
- To view objects in the public workspace, you must be assigned a role that includes the `View my bots` feature permission and the `View content` bot permission to folders in the public workspace.

Use filters such as bot names, folder paths, and IDs to narrow down the results. [Supported filterable fields](#) on page 1246

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: `<control_room_url>/v2/repository/file/list`  
Request body: The following example request searches for objects that contain the string finance in the path.

```
{
 "filter": {
 "operator": "substring",
 "field": "path",
```

```

 "value": "finance"
 }
}

```

### 3. Send the request.

Response body: The id in the following response is the unique identifier for the bot.

In this example response, the endpoint returns a bot with an object id of 12.

```

{
 "page": {
 "offset": 0,
 "total": 4,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "12",
 "parentid": "11",
 "name": "FinanceHelloWorldGBG.atmx",
 "permission": {
 "delete": false,
 "download": true,
 "execute": false,
 "upload": true,
 "run": false
 },
 "lastModified": "2020-01-08T22:24:08.060Z",
 "lastModifiedBy": "10",
 "path": "Automation Anywhere\\My Tasks\\Finance\\FinanceHelloWorldGBG.atmx",
 "directory": false,
 "size": 4578,
 "locked": false,
 "fileLastModified": "2020-01-08T22:21:58Z",
 "isProtected": false
 }
]
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## List files and folders in a specific folder API

Return details about objects (bots, folders, and files) in a specific parent folder. This endpoint returns the object id, which is a numeric value that is used in other APIs to identify the file, folder or bot.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- To view objects in your private workspace, you must have a Bot Creator license and a role that includes the `View my bots` feature permission.
- To view objects in the public workspace, you must be assigned a role that includes the `View my bots` feature permission and the `View content bot` permission to folders in the public workspace.
- You require the folder ID for the folder you want to search in. Use one of the following Repository Management APIs to retrieve the object ID:

- [List details about files, folders, and bots API](#) on page 1247
- [List files and folders by workspace API](#) on page 1250

The example in this task searches for subfolders that contain the string finance.

1. Add the authentication token to the request header.
2. Use the POST method and endpoint URL: <control\_room\_url>/v2/repository/folders/{folderId}/list

{folderId} is the object ID of the folder that in which you want to search.

Request body: The following example request searches for folders that contain the word finance in the name.

```
{
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "substring",
 "field": "name",
 "value": "finance"
 },
 {
 "operator": "eq",
 "field": "folder",
 "value": "true"
 }
]
 }
}
```

[Supported filterable fields](#) on page 1246

3. Send the request.

Response body: In a successful request, this endpoint returns the following data:

- `id`: a unique numeric identifier for the object that matches the search parameters.
- `parentId`: a unique numeric identifier for the parent folder.
- `folder`: a boolean value that returns `true` if the object is a folder and `false` if it is a bot or other file.

In this example response, the endpoint returns a folder with the object `id` of 40378.

```
{
 "page": {
 "offset": 0,
 "total": 329,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "40378",
 "parentId": "2",
 "name": "EOD-finance-reports",
 "path": "Automation Anywhere\\Bots\\APAC\\EOD-finance-reports",
 "description": "",
 "type": "application/vnd.aa.directory",
 "size": "0",
 "folder": true,
 "folderCount": "0",
 }
]
}
```

```

 "productionVersion": "",
 "latestVersion": "",
 "locked": false,
 "lockedBy": "0",
 "createdBy": "2587",
 "lastModifiedBy": "2587",
 "lastModified": "2020-09-02T05:26:51.162916Z",
 "permission": {
 "delete": true,
 "download": false,
 "upload": false,
 "run": true,
 "publishBotstore": false,
 "viewContent": true,
 "clone": false,
 "editContent": true,
 "createFolder": true,
 "move": true,
 "cancelCheckout": false,
 "revertCheckout": false
 },
 "workspaceId": "0",
 "botStatus": "DRAFT",
 "hasErrors": false,
 "workspaceType": "UNKNOWN",
 "metadata": false,
 "uri": "",
 "version": "0",
 "hasTriggers": false
 }
]
}

```

Use the numeric identifier, such as an id in subsequent APIs.

Related tasks

[Start migration API](#) on page 1225

Use this API to migrate bots (TaskBots and MetaBots) created using the Enterprise client version 11.x to A2019.

## List files and folders by workspace API

Return details on objects (files, folders, and bots) in either the public or private workspace. This endpoint returns the object id, which is a numeric value that is used in other APIs to identify the file, folder or bot.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the Authentication API to generate a JSON Web Token. See [Authentication API](#) on page 1171.
  - To view objects in your private workspace, you must have a Bot Creator license and a role that includes the `View my bots` feature permission.
  - To view objects in the public workspace, you must be assigned a role that includes the `View my bots` feature permission and the `View content` bot permission to folders in the public workspace.
1. Add the authentication token to the request header.
  2. Use the POST method and endpoint URL: `<control_room_url>/v2/repository/workspaces/{workspaceType}/files/list`  
 {workspaceType} specifies whether to search in the public or private workspace.

The following example request searches for objects that contain the string finance in the name.

Request body:

```
{
 "filter": {
 "operator": "substring",
 "field": "name",
 "value": "finance"
 }
}
```

[Supported filterable fields](#) on page 1246

3. Send the request.

Response body:

In this example response, this endpoint returns a bot with the object id of 14277.

```
{
 "page": {
 "offset": 0,
 "total": 1114,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "14277",
 "parentId": "9",
 "name": "financeWeeklyReport",
 "path": "Automation Anywhere\\Bots\\exampleBots",
 "description": "v1",
 "type": "application/vnd.aa.taskbot",
 "size": "799",
 "folder": false,
 "folderCount": "0",
 "productionVersion": "",
 "latestVersion": "",
 "locked": false,
 "lockedBy": "0",
 "createdBy": "22",
 "lastModifiedBy": "22",
 "lastModified": "2020-10-21T17:42:10.140037Z",
 "permission": {
 "delete": false,
 "download": false,
 "upload": false,
 "run": true,
 "publishBotstore": false,
 "viewContent": false,
 "clone": false
 },
 "workspaceId": "0",
 "botStatus": "PUBLIC",
 "hasErrors": false,
 "workspaceType": "UNKNOWN",
 "metadata": false,
 "uri": "",
 "version": "3",
 "hasTriggers": false,
 "isModified": false
 }
]
}
```



```
}
```

Response parameters:

- `id`: a unique numeric identifier for the object that matches the search parameters.
- `parentId`: a unique numeric identifier for the parent folder.
- `folder`: a boolean value that returns `true` if the object is a folder and `false` if it is a bot or other file.

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

If you are performing the steps to run a bot or to create an automation schedule, perform this task: [List available unattended Bot Runners API](#) on page 1215

## Delete file/folder API

Use this API to delete objects (bots, files, or folders) from the public or your private workspace.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

- Use the [Authentication API](#) to generate a JSON Web Token. See [Authentication API](#) on page 1171.
- You can delete bots, files, or folders from your private workspace. To delete objects from the public workspace, you must be assigned a role that contains the `Delete` bot permission on the folder that contains the objects that you want to delete.
- If you are deleting a folder, ensure that it is empty. Only empty folders can be deleted.
- To delete a file or folder, you must provide the object ID. Use one of the [Repository Management list APIs](#) to retrieve the object ID. [Choosing a Repository Management list API](#) on page 1246

1. Add the authentication token to the request header.
2. Use the DELETE method and endpoint URL: `<control_room_URL>/v2/repository/files/{id}`  
{id} is the object id of the file or folder that you want to delete.
3. Send the request.

Response body: A successful request returns the following message

```
204 Successful delete
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## User management APIs

Use [User Management APIs](#) to create, search, update, or delete roles and users in your Enterprise Control Room.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

## User Management Roles

Users need the following permissions in order to create and manage users and roles.

### View users

Users with these permissions are able to create and manage users. These are administrator permissions. It is recommended that non-administrator users be given limited permissions for creating and managing users. Learn how to [create a role with limited permissions](#) that can be assigned to users.

#### Create users

Create new users in the Enterprise Control Room.

#### Edit users

Edit all users in the Enterprise Control Room, including users created by other administrators.

#### Delete users

Delete any user in the Enterprise Control Room.

### View roles

Users with this permission can view roles to which they have access.

#### Manage roles

Users can create, edit and delete roles to which they have access.

### View licenses

Users with these permissions are able to view and manage device licenses. Device licenses are required to enable users to perform specific tasks. For example, Bot Creators require a DEVELOPMENT device license in order to create bots.

#### Manage users device license

Users with this permission can assign device licenses to other users.

## Role APIs

Use `Role` APIs to search for roles, create a role, retrieve a specific role using an object ID, update a role, or delete a role.

[Search for roles API](#) on page 1258

Retrieves current roles based on search criteria, such as filtering, sorting, and pagination.

```
POST http://<your_control_room_url>/v1/usermanagement/roles/list
```

[Create a new role API](#) on page 1255

Creates a new role with a new role name.

```
POST http://<your_control_room_url>/v1/usermanagement/roles
```

[Retrieve a specific role API](#) on page 1260

Retrieves a specific role based on a unique role ID.

```
GET http://<your_control_room_url>/v1/usermanagement/roles/{id}
```

[Update a role API](#) on page 1262

Modifies an existing role name based on a unique role ID.

```
PUT http://<your_control_room_url>/v1/usermanagement/roles/{id}
```

[Delete an existing role API](#) on page 1263

Deletes an existing role based on a unique role ID.

```
DELETE http://<your_control_room_url>/v1/usermanagement/roles/{id}
```

## User APIs

Use `User` APIs to create a user, search for users, retrieve a user details based on a user ID, update a specific user details, or delete a user.

[Create a new user API](#) on page 1263

Creates a user with a new user name.

```
POST http://<your_control_room_url>/v1/usermanagement/users
```

[Search for users API](#) on page 1268

Retrieves current users based on search criteria, such as filtering, sorting, and pagination.

```
POST http://<your_control_room_url>/v1/usermanagement/users/list
```

[Retrieve a specific user details API](#) on page 1270

Retrieves user details based on a unique user ID.

```
GET http://<your_control_room_url>/v1/usermanagement/users/{uid}
```

[Update an existing user details API](#) on page 1272

Modifies an existing user name based on a unique user ID.

```
PUT http://<your_control_room_url>/v1/usermanagement/users/{uid}
```

[Delete an existing user API](#) on page 1273

Deletes an existing user based on a unique user ID.

```
DELETE http://<your_control_room_url>/v1/usermanagement/users/{uid}
```

Related concepts

[Authentication API](#) on page 1171

Use the Authentication API to generate, refresh, and manage the JSON Web Tokens (JWTs) that are required for authentication and authorization in order to use the Enterprise Control Room APIs.

Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Create a new role API

Use `Create role` API to create a new role with permissions in the Enterprise Control Room.

Ensure you have an admin role or a custom role with View and Manage Roles permission to create a new role.

Each permission requires the following mandatory parameters:

- `id`: The numeric value that uniquely identifies the permission.
- `action`: The action the permission enables.
- `resourceType`: The resource group to which the action belongs.

Typically a user is given the role permission in conjunction with user management permission. [Roles and permissions](#) on page 1274

1. Use the `Authentication API` to generate a JSON Web Token. See [Authentication API](#) on page 1171.
2. Use the POST method and endpoint URL: `<your_control_room_url>/v1/usermanagement/roles`

The following request creates a new role that allows a user to create and manage roles and users in the Enterprise Control Room.

Request body:

```
{
 "name": "Role to manage users and roles",
 "description": "These are limited administrator permission.",
 "permissions": [
 {
 "id": 1,
 "action": "usermanagement",
 "resourceType": "usermanagement"
 },
 {
```

```

 "id": 3,
 "action": "createuser",
 "resourceType": "usermanagement"
 },
 {
 "id": 4,
 "action": "updateuser",
 "resourceType": "usermanagement"
 },
 {
 "id": 2,
 "action": "deleteuser",
 "resourceType": "usermanagement"
 },
 {
 "id": 62,
 "action": "rolesview",
 "resourceType": "rolesmanagement"
 },
 {
 "id": 12,
 "action": "rolesmanagement",
 "resourceType": "rolesmanagement"
 }
]
}

```

3. Send the request.

Response body:

```

{
 "id": 767,
 "createdBy": 3215,
 "createdOn": "2020-03-19T22:44:21Z",
 "updatedBy": 3215,
 "updatedOn": "2020-03-19T22:44:21Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "description": "These are limited administrator permission.",
 "name": "Role to manage users and roles",
 "accessRestriction": null,
 "permissions": [
 {
 "id": 1,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "usermanagement",
 "resourceId": null,
 "resourceType": "usermanagement"
 },
 {
 "id": 2,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,

```

```

 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "deleteuser",
 "resourceId": null,
 "resourceType": "usermanagement"
 },
 {
 "id": 4,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "updateuser",
 "resourceId": null,
 "resourceType": "usermanagement"
 },
 {
 "id": 12,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "rolesmanagement",
 "resourceId": null,
 "resourceType": "rolesmanagement"
 },
 {
 "id": 62,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "rolesview",
 "resourceId": null,
 "resourceType": "rolesmanagement"
 },
 {
 "id": 3,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "createuser",
 "resourceId": null,
 "resourceType": "usermanagement"
 }
],
"countPrincipals": 0,
"principals": []
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Search for roles API

Use the `Search for Roles` API to retrieve a list of all roles in the Enterprise Control Room.

Ensure you have an admin role or a custom role with View Roles permission to search for roles.

1. Add the authentication token to the request header.
2. Apply filters to perform basic conditional queries and pagination control for processing web pages. There are three basic features related to filtering: filtering conditions, sorting columns, and pagination parameters. See [Filters in an API request body](#) on page 1308.
3. Use the POST method and endpoint URL: `<your control room>/v1/usermanagement/roles/list`

The following request finds roles with a name that contains `test` and were created between June 1 and October 6, 2020.

Request body:

```
{
 "fields": [],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "substring",
 "field": "name",
 "value": "test"
 },
 {
 "operator": "gt",
 "field": "createdOn",
 "value": "2020-06-01T00:00:00.989Z"
 },
 {
 "operator": "lt",
 "field": "createdOn",
 "value": "2020-10-06T23:00:00.123Z"
 }
]
 }
}
```

4. Send the request.

In this example, the response body brings five roles with the name `test`, and when and who created a role, as well as, whether a role was a system created role or not.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 106,
 "totalFilter": 5
 },
 "list": [
 {
 "id": 102,
```

```

 "name": "whatfixtest",
 "description": "",
 "countPrincipals": 0,
 "version": 3,
 "createdBy": 278,
 "createdOn": "2020-06-02T18:22:55.633Z",
 "updatedBy": 34,
 "updatedOn": "2020-09-02T23:26:11.930Z",
 "systemRole": false
 },
 {
 "id": 115,
 "name": "export-role-test",
 "description": "",
 "countPrincipals": 5,
 "version": 8,
 "createdBy": 261,
 "createdOn": "2020-06-04T10:59:45.343Z",
 "updatedBy": 96,
 "updatedOn": "2020-09-14T16:56:33.310Z",
 "systemRole": false
 },
 {
 "id": 391,
 "name": "testROle",
 "description": "",
 "countPrincipals": 0,
 "version": 0,
 "createdBy": 169,
 "createdOn": "2020-07-01T01:08:45.243Z",
 "updatedBy": 169,
 "updatedOn": "2020-07-01T01:08:45.243Z",
 "systemRole": false
 },
 {
 "id": 401,
 "name": "bi-test-role",
 "description": "",
 "countPrincipals": 1,
 "version": 5,
 "createdBy": 1,
 "createdOn": "2020-07-02T02:56:57.893Z",
 "updatedBy": 96,
 "updatedOn": "2020-09-14T16:56:33.280Z",
 "systemRole": false
 },
 {
 "id": 470,
 "name": "repo_test",
 "description": "",
 "countPrincipals": 1,
 "version": 1,
 "createdBy": 1,
 "createdOn": "2020-09-09T07:49:46.993Z",
 "updatedBy": 96,
 "updatedOn": "2020-09-14T16:56:32.913Z",
 "systemRole": false
 }
]
}

```



The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Retrieve a specific role API

Use the `Get role by ID` API to retrieve a specific role in the Enterprise Control Room.

Ensure you have an admin role or a custom role with View Roles permission.

- URL: `http://<your_control_room_url>/v1/usermanagement/roles/{ID}`
  - Method: GET
  - Use the Swagger definition files installed with your Enterprise Control Room to test the APIs. View the available Swagger APIs at: `http://<your_control_room_url>/swagger/`
  - You can also use a REST client to complete this task.
1. Add the authentication token to the request header.
  2. Add a role ID that you want to retrieve, for example, `customRole`.
  3. Use the GET method and endpoint URL: `<your_control_room_url>/v1/usermanagement/roles/<role ID>`
  4. Send the request.

Response body:

```
{
 "id": 740,
 "createdBy": 2623,
 "createdOn": "2020-02-24T19:08:09Z",
 "updatedBy": 2623,
 "updatedOn": "2020-02-24T19:08:09Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "description": "",
 "name": "customRole",
 "accessRestriction": null,
 "permissions": [
 {
 "id": 59,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "managecredentials",
 "resourceId": null,
 "resourceType": "credentials"
 },
 {
 "id": 12,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "rolesmanagement",

```

```

 "resourceId": null,
 "resourceType": "rolesmanagement"
 },
 {
 "id": 62,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "rolesview",
 "resourceId": null,
 "resourceType": "rolesmanagement"
 },
 {
 "id": 58,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "myschedule",
 "resourceId": null,
 "resourceType": "taskscheduling"
 },
 {
 "id": 97,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:39Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:39Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "view",
 "resourceId": null,
 "resourceType": "dashboard"
 },
 {
 "id": 30,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "view",
 "resourceId": null,
 "resourceType": "devices"
 }
],
"countPrincipals": 0,
"principals": []
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Update a role API

Use the `Update role` API to update an existing role in the Enterprise Control Room.

Ensure you have an admin role or a custom role with Edit Roles permission.

1. Add the authentication token to the request header.
2. Use the PUT method and endpoint URL: `<your_control_room_url>/v1/usermanagement/roles/<role ID>`
3. In the request URL, add a role ID you want to update. This example shows how to add a single permission, View users to the custom role with the ID of 740.

Request body:

```
{
 "id": null,
 "name": "Add_one_permission",
 "accessRestriction": null,
 "permissions": [
 {
 "id": 1,
 "action": "usermanagement",
 "resourceType": "usermanagement"
 }
]
}
```

4. Send the request.

Response body:

```
{
 "id": 740,
 "createdBy": 2623,
 "createdOn": "2020-02-24T19:08:09Z",
 "updatedBy": 3215,
 "updatedOn": "2020-03-20T21:40:34Z",
 "tenantId": 1,
 "version": 4,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "description": null,
 "name": "Add_one_permission",
 "accessRestriction": null,
 "permissions": [
 {
 "id": 1,
 "createdBy": 0,
 "createdOn": "2019-05-21T03:09:31Z",
 "updatedBy": 0,
 "updatedOn": "2019-05-21T03:09:31Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "e100fbce-008c-04ec-4063-7af0af91fb2f",
 "action": "usermanagement",
 "resourceId": null,
 "resourceType": "usermanagement"
 }
],
 "countPrincipals": 0,
 "principals": []
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Delete an existing role API

Use the `Delete role` API to delete an existing role in the Enterprise Control Room.

Ensure you have an admin role or a custom role with Manage Roles permission. You can only delete custom roles you cannot delete the system-created roles.

- URL: `http://<your_control_room_url>/v1/usermanagement/roles/{ID}`  
Replace the content in the angle brackets with your Enterprise Control Room URL.
- Method: DELETE
- Use the Swagger definition files installed with your Enterprise Control Room to test the APIs. View the available Swagger APIs at: `http://<your_control_room_url>/swagger/`
- You can also use a REST client to complete this task.

1. Add the authentication token to the request header.
2. Use the DELETE as the endpoint URL: `<your_control_room_url>/v1/usermanagement/roles/<role ID>`
3. In the request header, add a role ID you want to delete.
4. Send the request.

Response body:

```
"OK"
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Create a new user API

Use the `Create user` API to create a new user in the Enterprise Control Room.

View and manage users and roles

Authenticate with a user that has the following ADMINISTRATION permissions:

View users

Users with these permissions are able to create and manage users. These are administrator permissions. It is recommended that non-administrator users be given limited permissions for creating and managing users. Learn how to [create a role with limited](#)

[permissions](#) that can be assigned to users.

|              |                                                                                                 |
|--------------|-------------------------------------------------------------------------------------------------|
| Create users | Create new users in the Enterprise Control Room.                                                |
| Edit users   | Edit all users in the Enterprise Control Room, including users created by other administrators. |
| Delete users | Delete any user in the Enterprise Control Room.                                                 |

#### View roles

Users with this permission can view roles to which they have access.

|              |                                                                    |
|--------------|--------------------------------------------------------------------|
| Manage roles | Users can create, edit and delete roles to which they have access. |
|--------------|--------------------------------------------------------------------|

#### View licenses

Users with these permissions are able to view and manage device licenses. Device licenses are required to enable users to perform specific tasks. For example, Bot Creators require a DEVELOPMENT device

license in order to create bots.

|                             |                                                                       |
|-----------------------------|-----------------------------------------------------------------------|
| Manage users device license | Users with this permission can assign device licenses to other users. |
|-----------------------------|-----------------------------------------------------------------------|

#### Minimum required parameters

- Roles: Each user must have at least one role.

[Role](#) based accessibility enables appropriate access to relevant data and actions.

In the request body, we assigned this permission AAE\_Basic (ID: 2)

[Roles and permissions](#) on page 1274

- username: String (255 max)
- email: Must conform to standard email format (username@domain.com)
- password: String: 8-15 characters in length. Allowable characters: a-z, A-Z, 0-9, @, -, \_, !, #, \$, %, &, and . (period)

#### Optional parameters

- "enableAutoLogin": true
- "username": "AnyUser"
- "firstName": "Tester"
- "lastName": "Writer"
- "email": "username@mydomain.com"
- "password": "anypassword"
- "description": "Testing User Management APIs"
- "licenseFeatures": [ DEVELOPMENT, RUNTIME, IQBOTRUNTIME, ANALYTICSCLIENT, ANALYTICSAPI ]

Users can be created without an assigned device license. There are [Roles and permissions](#) on page 1274 that enable privileges for specific users and roles.

- URL: `http://<your_control_room_url>/v1/usermanagement/users`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: POST
- Use the Swagger installed with your Enterprise Control Room to test the APIs. View the available APIs at: `http://<your_control_room_url>/swagger/`
- You can also use a REST client to complete this task.

1. Add the authentication token to the request header.

2. Use the POST method and endpoint URL:<your\_control\_room\_url>/v1/usermanagement/users
3. In the request body, enter the mandatory and optional parameters.  
For SAML-based single sign-on (SSO) or Active Directory (AD) access, the password is not required. The password is mandatory for a database authentication.

Request body :

```
{
 {
 "roles": [
 {
 "id": 2
 }
],
 "domain": "string",
 "email": "ad@ma.com",
 "enableAutoLogin": true,
 "username": "mdadmin1",
 "firstName": "MDadmin2",
 "lastName": "ADadmin",
 "description": "string",
 "disabled": true,
 "password": "changeme",
 "licenseFeatures": [
 "DEVELOPMENT"
]
 }
}
```

4. Send the request.

Response body:

```
{
 "id": 2075,
 "username": "mdadmin1",
 "domain": "string",
 "firstName": "MDadmin2",
 "lastName": "ADadmin",
 "version": 0,
 "principalId": 2075,
 "deleted": false,
 "roles": [
 {
 "name": "AAE_Basic",
 "id": 2,
 "version": 0
 }
],
 "sysAssignedRoles": [],
 "groupNames": [],
 "permissions": [
 {
 "id": 7526,
 "action": "viewuserrolebasicinfo",
 "resourceId": null,
 "resourceType": "usermanagement"
 },
 {
 "id": 7,
 "action": "run",
 "resourceId": null,
 "resourceType": "repositorymanager"
 }
]
}
```

```

 },
 {
 "id": 94,
 "action": "view",
 "resourceId": null,
 "resourceType": "botstore"
 },
 {
 "id": 61,
 "action": "createstandard",
 "resourceId": null,
 "resourceType": "credentialattribute"
 },
 {
 "id": 92,
 "action": "view",
 "resourceId": null,
 "resourceType": "packagemanager"
 },
 {
 "id": 97,
 "action": "register",
 "resourceId": null,
 "resourceType": "devices"
 },
 {
 "id": 29,
 "action": "view",
 "resourceId": null,
 "resourceType": "repositorymanager"
 },
 {
 "id": 120,
 "action": "view",
 "resourceId": null,
 "resourceType": "dashboard"
 }
],
 "licenseFeatures": [
 "DEVELOPMENT"
],
 "emailVerified": false,
 "passwordSet": false,
 "questionsSet": false,
 "enableAutoLogin": true,
 "disabled": true,
 "clientRegistered": false,
 "description": "string",
 "createdBy": 1513,
 "createdOn": "2020-11-20T20:17:26Z",
 "updatedBy": 1513,
 "updatedOn": "2020-11-20T20:17:26Z",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null,
 "email": "ad@ma.com"
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.



## Search for users API

Use the `Search for users` API to search for all users in the Enterprise Control Room.

Ensure you have an admin role or a custom role with View Users permission.

1. Add the authentication token to the request header.
2. Apply filters to perform basic conditional queries and pagination control for processing web pages. There are three basic features related to filtering: filtering conditions, sorting columns, and pagination parameters. See [Filters in an API request body](#) on page 1308.
3. Use the POST method and endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/list

Request body:

```
{
 "fields": [],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "substring",
 "field": "username",
 "value": "mdadmin"
 },
 {
 "operator": "gt",
 "field": "createdOn",
 "value": "2020-09-01T00:00:00.989Z"
 },
 {
 "operator": "lt",
 "field": "createdOn",
 "value": "2020-09-06T23:00:00.123Z"
 }
]
 }
}
```

4. Send the request.

The following request finds all users with a username that contains admin and were created between September 1 and September 6, 2020.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 310,
 "totalFilter": 2
 },
 "list": [
 {
 "id": 1513,
 "username": "mdadmin",
 "domain": "",
 "firstName": "MD_tester",
 "lastName": "MD_user",
 "version": 17,
 "principalId": 1513,
 "email": "md@aa.com",

```

```

 "emailVerified": true,
 "passwordSet": true,
 "questionsSet": true,
 "enableAutoLogin": false,
 "disabled": false,
 "clientRegistered": false,
 "description": "To be used for API testing",
 "createdBy": 1,
 "createdOn": "2020-09-01T11:01:17.760Z",
 "updatedBy": 1,
 "updatedOn": "2020-09-01T11:01:17.760Z",
 "licenseFeatures": [],
 "roles": [
 {
 "id": 1,
 "name": "AAE_Admin"
 },
 {
 "id": 2,
 "name": "AAE_Basic"
 }
],
 "deleted": false
 },
 {
 "id": 1520,
 "username": "mt_admin",
 "domain": "",
 "firstName": "",
 "lastName": "",
 "version": 6,
 "principalId": 1520,
 "email": "a@a.com",
 "emailVerified": true,
 "passwordSet": true,
 "questionsSet": true,
 "enableAutoLogin": false,
 "disabled": false,
 "clientRegistered": false,
 "description": "",
 "createdBy": 1,
 "createdOn": "2020-09-02T08:47:19.723Z",
 "updatedBy": 1,
 "updatedOn": "2020-09-02T08:47:19.723Z",
 "licenseFeatures": [],
 "roles": [
 {
 "id": 1,
 "name": "AAE_Admin"
 }
],
 "deleted": false
 }
]
}

```

The response returned data for two user names containing the word admin, mdadmin and mt\_admin.

Response parameters:

| Parameter Name | Description                                                                                                          |
|----------------|----------------------------------------------------------------------------------------------------------------------|
| id             | System-generated ID number who created a user.                                                                       |
| username       | User name for a new user.                                                                                            |
| domain         | Active directory domain name.                                                                                        |
| version        | System-generated version number for a new user.                                                                      |
| email          | New user email address.                                                                                              |
| passwordSet    | String: 8-15 characters; a-z, A-Z, 0-9, @, -, _, !, #, \$, %, &, and . (period). Set a password for a new user only. |
| PrincipalId    | System-generated ID number of an active directory principal user who created a new user.                             |
| Permission     | A specific permission ID.                                                                                            |
| licenseFeature | Automation Anywhere license associated with this role.                                                               |
| Roles: id      | System-generated role ID number associated with this user. Not every user has an associated role.                    |
| createdBy      | System-generated ID number of an admin user who created a new user.                                                  |
| updatedBy      | System-generated ID number of an admin user who updated the user.                                                    |

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Retrieve a specific user details API

Use the `Get user details` API to retrieve a specific user details in the Enterprise Control Room.

Ensure you have an admin role or a custom role with View Users permission.

1. Add the authentication token to the request header.
2. In the request header, add a specific user ID you want to retrieve.
3. Use the GET method and endpoint URL: `<your_control_room_url>/v1/usermanagement/users/<user ID>`
4. Send the request.

We are sending request to retrieve details for the specific user ID: 2075

Response body:

```
{
 "id": 2075,
 "username": "mdadmin1",
 "domain": "string",
```

```

"firstName": "MDadmin2",
"lastName": "ADadmin",
"version": 0,
"principalId": 2075,
"deleted": false,
"roles": [
 {
 "name": "AAE_Basic",
 "id": 2,
 "version": 0
 }
],
"sysAssignedRoles": [],
"groupNames": [],
"permissions": [
 {
 "id": 7526,
 "action": "viewuserrolebasicinfo",
 "resourceId": null,
 "resourceType": "usermanagement"
 },
 {
 "id": 7,
 "action": "run",
 "resourceId": null,
 "resourceType": "repositorymanager"
 },
 {
 "id": 94,
 "action": "view",
 "resourceId": null,
 "resourceType": "botstore"
 },
 {
 "id": 61,
 "action": "createstandard",
 "resourceId": null,
 "resourceType": "credentialattribute"
 },
 {
 "id": 92,
 "action": "view",
 "resourceId": null,
 "resourceType": "packagemanager"
 },
 {
 "id": 97,
 "action": "register",
 "resourceId": null,
 "resourceType": "devices"
 },
 {
 "id": 29,
 "action": "view",
 "resourceId": null,
 "resourceType": "repositorymanager"
 },
 {
 "id": 120,
 "action": "view",
 "resourceId": null,
 "resourceType": "dashboard"
 }
],

```

```

 "licenseFeatures": [
 "DEVELOPMENT"
],
 "emailVerified": false,
 "passwordSet": false,
 "questionsSet": false,
 "enableAutoLogin": true,
 "disabled": true,
 "clientRegistered": false,
 "description": "string",
 "createdBy": 1513,
 "createdOn": "2020-11-20T20:17:26Z",
 "updatedBy": 1513,
 "updatedOn": "2020-11-20T20:17:26Z",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null,
 "email": "ad@ma.com"
 }

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Update an existing user details API

Use the `Update user details` API to update an existing user information in the Enterprise Control Room.

Ensure you have an admin role or a custom role with Edit Users permission.

1. Add the authentication token to the request header.
2. Use the PUT method and endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/2075
3. In the request header, add an existing user ID you want to update. To find a user ID you want to update, execute the `Search for users` API.

The following request body is for an existing user ID: 2075

In the request body, add the request parameters you want to modify, for example, the role ID and the email address.

Request body

```

{
 "roles": [
 {
 "id": 1
 }
],
 "email": "md5@aa.com"
}

```

4. Send the request.

The response body returns the updated email address for the user ID: 2075 and the role ID: 1.

Response body:

```

{
 "id": 2075,

```

```

"username": "mdadmin1",
"domain": "string",
"firstName": null,
"lastName": null,
"version": 0,
"principalId": 2075,
"deleted": false,
"roles": [
 {
 "name": "AAE_Admin",
 "id": 1,
 "version": 0
 }
],
"sysAssignedRoles": [],
"groupNames": [],
"permissions": [
 {
 "id": 22,
 "action": "operationroom",
 "resourceId": null,
 "resourceType": "operationroom"
 },

 {
 "id": 32,
 "action": "import",
 "resourceId": null,
 "resourceType": "repositorymanager"
 }
],
"licenseFeatures": [],
"emailVerified": false,
"passwordSet": false,
"questionsSet": false,
"enableAutoLogin": false,
"disabled": false,
"clientRegistered": false,
"description": null,
"createdBy": 1513,
"createdOn": "2020-11-20T20:17:26Z",
"updatedBy": 1513,
"updatedOn": "2020-11-20T20:32:46Z",
"publicKey": null,
"appType": null,
"routingName": null,
"appUrl": null,
"email": "md5@aa.com"
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Delete an existing user API

Use the `Delete user` API to delete an existing user in the Enterprise Control Room.

Ensure you have an admin role or a custom role with Edit Users permission.

- URL: `http://<your_control_room_url>/v1/usermanagement/users/{ID}`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: DELETE
1. Add the authentication token to the request header. Add an authentication token to the request header.
  2. In the request header, add an existing user ID you want to delete.
  3. Use the DELETE method. and endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/<user ID>
  4. Send the request.

Response body:

```
{
 "id": 3014,
 "email": "a@a.com",
 "username": "docstest01",
 "domain": null,
 "firstName": null,
 "lastName": null,
 "version": 4,
 "principalId": 3014,
 "deleted": false,
 "roles": [],
 "sysAssignedRoles": [],
 "groupNames": [],
 "permissions": [],
 "licenseFeatures": [],
 "emailVerified": true,
 "passwordSet": false,
 "questionsSet": false,
 "enableAutoLogin": false,
 "disabled": false,
 "clientRegistered": false,
 "description": null,
 "createdBy": 2623,
 "createdOn": "2020-01-31T17:33:16Z",
 "updatedBy": 3215,
 "updatedOn": "2020-03-22T22:51:48Z",
 "publicKey": null,
 "appType": null,
 "routingName": null,
 "appUrl": null
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Roles and permissions

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

Roles are a logical container for permissions and have interdependencies with bots, users, and licenses. Users with the **AAE\_Admin** role can create custom roles and assign roles to users.

The following topics provide descriptions of the features and the necessary information to create and assign roles with the [User Management API](#).

Related concepts

[Enterprise Control Room APIs](#) on page 1165

The Automation Anywhere Enterprise Control Room provides various APIs that allow you to customize the way that you (and your bots) interact with Automation Anywhere. Users can perform tasks such as manage bot deployments, create and manage credentials in the Credential Vault, create and manage user accounts and roles, and create and manage queues.

Related tasks

[Create a new role API](#) on page 1255

Use `Create role` API to create a new role with permissions in the Enterprise Control Room.

## System-created roles

Enterprise A2019 includes predefined roles that cannot be edited or deleted. Each role has the standard permissions, plus the permissions necessary to perform the tasks within the scope of that role.

## Standard permissions

All system-created roles include the following permissions:

- View dashboards
- View my in progress activity
- Manage my credentials and lockers
- Create standard attributes for a credential (except for Discovery Bot roles)
- View and manage my Bot runners, Bot creators, and devices
- View and manage my queues
- View users and roles basic information

## System-created roles

Use the role IDs in the table below to assign the role to a user in the [Create a new user API](#) on page 1263 or [Update an existing user details API](#) on page 1272 endpoints.

| Role ID | Name                 | Description                                                                                                                                                                                                  |
|---------|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | AAE_Admin            | Allows access to all features, including creating other Admin users and access to all folders and files. The only role that can access Enterprise Control Room settings.                                     |
| 2       | AAE_Basic            | Permissions to create credentials and set a standard attribute value, view and run their bots, view the Bot Store, register a device, and view packages.                                                     |
| 3       | AAE_Locker Admin     | Can view all credentials and all lockers. They can change the owner of a credential that they do not own. For lockers they do not own, they can delete the locker, edit permissions, and remove credentials. |
| 4       | AAE_IQ Bot Validator | For a Bot Runner with an IQ Bot license. Permissions to access the IQ Bot Validator                                                                                                                          |



| Role ID | Name                     | Description                                                                                                                                                                                                                                                                                                                                                                     |
|---------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |                          | screen. Limited access to Enterprise Control Room features.                                                                                                                                                                                                                                                                                                                     |
| 5       | AAE_Bot Insight Consumer | When combined with an Analytics license, this role grants the user the ability to view data in Bot Insight.                                                                                                                                                                                                                                                                     |
| 6       | AAE_Bot Insight Expert   | When combined with an Analytics license, this role grants the user the ability to view and manage data in Bot Insight.                                                                                                                                                                                                                                                          |
| 9       | AAE_IQ Bot Services      | Permissions to access the IQ Bot console. Limited access to Enterprise Control Room features.                                                                                                                                                                                                                                                                                   |
| 10      | AAE_Queue Admin          | Permissions to view and manage all queues.                                                                                                                                                                                                                                                                                                                                      |
| 11      | AAE_Pool Admin           | Permissions to view and manage all device pools.<br><br> Note: This role does not grant permission to view bots.                                                                                                                                                                               |
| 12      | AAE_Bot Insight Admin    | The only role that can use Bot Insight APIs to access the data logged by the Enterprise Control Room, and by a task during Production runs.                                                                                                                                                                                                                                     |
| 14      | AAE_IQ Bot Admin         | Allows access to all IQ Bot features.                                                                                                                                                                                                                                                                                                                                           |
| 15      | AAE_Bot Store Publisher  | Permissions to submit bot package or Digital Worker to Bot Store.                                                                                                                                                                                                                                                                                                               |
| 16      | AAE_Bot Developer        | Permissions view, run, and import their bots, create folders, manage packages, and download bots and Digital Workers from the Bot Store to their private workspace.<br><br> Note: This role does not grant permission to register a device, or check bots in or out of the public workspace. |
| 17      | AAE_Discovery Bot Admin  | Allows access to view all Discovery Bot processes. Manages the creation, deletion, and editing of processes.                                                                                                                                                                                                                                                                    |
| 18      | AAE_Discovery Bot User   | Allows access to view the assigned Discovery Bot process assigned to a user. Create and run the Discovery Bot recorder for assigned business processes. Permissions to view, edit, and delete a user's own recordings.                                                                                                                                                          |

| Role ID | Name                          | Description                                                                                                                                                                                                                                                                                                                                                 |
|---------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19      | AAE_Discovery Bot Analyst     | Allows access to view and edit all approved recordings from assigned users for a given process. Permissions for system generated aggregated view of recordings to view, create, edit, and delete views. Permissions to create, view, edit, and delete opportunities for assigned processes. Export the opportunity to a word document and convert to a bot. |
| 74      | AAE_Robotic Interface Admin   |                                                                                                                                                                                                                                                                                                                                                             |
| 75      | AAE_Robotic Interface Manager |                                                                                                                                                                                                                                                                                                                                                             |
| 76      | AAE_Robotic Interface User    |                                                                                                                                                                                                                                                                                                                                                             |

#### Related concepts

[Enterprise Control Room APIs](#) on page 1165

The Automation Anywhere Enterprise Control Room provides various APIs that allow you to customize the way that you (and your bots) interact with Automation Anywhere. Users can perform tasks such as manage bot deployments, create and manage credentials in the Credential Vault, create and manage user accounts and roles, and create and manage queues.

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create role` API to create a new role with permissions in the Enterprise Control Room.

## Administration permissions

Enable users to create and manage users and roles, to manage and update migrations, and to install Enterprise Control Room licenses.

We recommend that you create individual roles with only specific administrative permissions. You can then assign the limited permission to users with just that specific permission requirement.

## Users and roles permissions

| Permission ID | Action         | Resource Type  | Description                                                                                                                                                                                                                                                                                                                                    |
|---------------|----------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | usermanagement | usermanagement | Users can only view all other users in the system. They cannot create, edit, or delete users.<br><br> Note: You must assign this permission before assigning the <code>createuser</code> , <code>updateuser</code> , or <code>deleteuser</code> permission. |
| 2             | deleteuser     | usermanagement | Users can delete other users the Enterprise Control Room.                                                                                                                                                                                                                                                                                      |

| Permission ID | Action              | Resource Type   | Description                                                                                                                                                                                                                                                                  |
|---------------|---------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3             | createuser          | usermanagement  | Users can create new users in the Enterprise Control Room.                                                                                                                                                                                                                   |
| 4             | updateuser          | usermanagement  | Users can edit all users in the system.                                                                                                                                                                                                                                      |
| 62            | rolesview           | rolesmanagement | Users with this permission are able to view the roles in the Enterprise Control Room.<br><br> <u>Note: You must assign this permission before assigning the rolesmanagement permission.</u> |
| 12            | rolesmanagement     | rolesmanagement | Users can view and manage all roles in the Enterprise Control Room.                                                                                                                                                                                                          |
| 994           | viewuserrolebasinfo | usermanagement  | Users can view basic information on users and roles.                                                                                                                                                                                                                         |

### Migration permissions

| Permission ID | Action       | Resource Type | Description                                                                                                                                                                                                                              |
|---------------|--------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 123           | view         | migration     | Users can view new migrations, but not run them<br><br> <u>Note: You must assign this permission before assigning the manage migration permission</u> |
| 56            | manage       | migration     | Users can view and run new migrations                                                                                                                                                                                                    |
| 124           | updatestatus | migration     | Allows Bot Runner Run-as user to update the bot conversion status in the Enterprise Control Room                                                                                                                                         |

### Licenses permissions

| Permission ID | Action                | Resource Type     | Description                                                                                |
|---------------|-----------------------|-------------------|--------------------------------------------------------------------------------------------|
| 20            | licensemanagement     | licensemanagement | Users can assign device licenses to other users.                                           |
| 49            | licenseinstall        | licensemanagement | Users can install Automation Anywhere Enterprise licenses for the Enterprise Control Room. |
| 48            | licenseuserallocation | licensemanagement | Users can view the license details for the Enterprise Control Room.                        |



Note: Only a user with the **AAE\_Admin** role has the ability to view and manage settings in the Enterprise Control Room. See [System-created roles](#) on page 1275.

## Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

## Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## API permissions

Enables access to Bot Insight APIs and the ability to generate an API key.

| Permission ID | Action         | Resource Type | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|----------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 47            | botinsightapi  | api           | Allows access to Bot Insight RESTful APIs to the data logged by the Enterprise Control Room and by a task during production runs.                                                                                                                                                                                                                                                                                                                                      |
| 91            | generateapikey | api           | <p>Users can generate an apiKey that can be used in the Authentication API.</p> <p><a href="#">Authenticate with username and apiKey API</a> on page 1174</p> <hr/> <p> Note: Users without the generateapikey permission can use APIs by authenticating using their username and password.</p> <p><a href="#">Authenticate with username and password API</a> on page 1172</p> <hr/> |

## Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

## Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Audit log permissions

View logs and details to record user activities. Enable users to view logs from the Enterprise Control Room.

| Permission ID | Action           | Resource Type    | Description                                                           |
|---------------|------------------|------------------|-----------------------------------------------------------------------|
| 14            | recentactivities | recentactivities | Users can view all audit log activity for the Enterprise Control Room |

## Related tasks

[Create a new role API](#) on page 1255

Use `Create role` API to create a new role with permissions in the Enterprise Control Room.

Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Automation Anywhere Robotic Interface (AARI) permissions

Assign AARI permissions to a custom role.

| Permission ID | Action                      | Resource Type | Description                                                                                                                                                                                                                                                                         |
|---------------|-----------------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 664           | aaricrosssteamread          | aari          | View all teams and see the team members                                                                                                                                                                                                                                             |
| 665           | aaricrossprocessread        | aari          | View all processes and see team members and managers                                                                                                                                                                                                                                |
| 662           | aariteammanagement          | aari          | Create and view teams, edit team names, descriptions, and process tags. Add new teams, team members, and assigned processes                                                                                                                                                         |
| 663           | aaritaskmanagement          | aari          | Submit and view tasks from processes that are assigned to the team                                                                                                                                                                                                                  |
| 661           | aaricasemanagement          | aari          | Create and view requests from processes that are assigned to the team                                                                                                                                                                                                               |
| 691           | aariglobalcasemanagement    | aari          | View process requests and tasks.<br><br> Note: This permission does not grant the ability to create a request or submit a task                                                                   |
| 689           | aariglobalprocessmanagement | aari          | View checked-in public processes and assigned managers and teams, edit process tags, and assign managers and teams<br><br> Note: This permission does not grant the ability to create a process. |
| 690           | aariglobalteammanagement    | aari          | View teams and assigned users, edit team names and descriptions. Add new processes, managers and users to a team<br><br> Note: This permission does not grant the ability to create a team.      |

## Bot and bot credential permissions

Enables users to access features for managing bots and the credentials used by bots.

### Bots permissions

| Permission ID | Action         | Resource Type     | Description                                                                                                                                                                                                                                                 |
|---------------|----------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 29            | view           | repositorymanager | Allows users to view the bots they created and bots that were assigned to them.<br><br> Note: You must assign this permission before assigning any other bots permissions. |
| 7             | run            | repositorymanager | Allows users to run the bots they created and bots that were assigned to them.                                                                                                                                                                              |
| 31            | export         | repositorymanager | Allows users to export bots and related bot dependencies for which they have download permission.                                                                                                                                                           |
| 32            | import         | repositorymanager | Allows users to import bots and bot dependencies for which they have upload permission.                                                                                                                                                                     |
| 54            | createfolders  | repositorymanager | Allows users to create folders within the folders that they have access to.                                                                                                                                                                                 |
| 55            | renamefolders  | repositorymanager | Allows users to rename the folders they have access to.<br><br> Note: Only empty folders can be renamed.                                                                 |
| 1158          | cancelcheckout | repositorymanager | Allows users to cancel bot checkout and unlock the file from the public repository.                                                                                                                                                                         |

### Credentials and lockers permissions

| Permission ID | Action            | Resource Type | Description                                                                                                                                                                                                                                                                           |
|---------------|-------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 59            | managecredentials | credentials   | User can create, edit, and delete their own credentials. In addition, the user can interact with credentials from their assigned lockers.<br><br> Note: All roles have this permission by default. |
| 26            | create            | locker        | User can create and manage their own lockers.                                                                                                                                                                                                                                         |

| Permission ID | Action         | Resource Type            | Description                                                                                                |
|---------------|----------------|--------------------------|------------------------------------------------------------------------------------------------------------|
| 61            | createstandard | credentialattribute      | User can create a standard attribute for a credential that is shared across all users of that credential . |
| 64            | updateany      | credentialattributevalue | User can view and edit attributes that belong to other users.                                              |
| 46            | botautologinap | credentialattributevalue | User can automate the login process to run bots remotely.                                                  |



Note: A user with the `AAE_Locker_Admin` role can view all credentials and lockers in the Enterprise Control Room. See [System-created roles](#) on page 1275.

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Bot Store permissions

Enables users to view and manage Bot Store packages.

| Permission ID | Action  | Resource Type | Description                                                                                  |
|---------------|---------|---------------|----------------------------------------------------------------------------------------------|
| 94            | view    | botstore      | User can view Bot Store.                                                                     |
| 95            | addfrom | botstore      | User can add bot packages from Bot Store to their Enterprise Control Room private workspace. |
| 96            | submit  | botstore      | User can submit bot packages to Bot Store.                                                   |

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Dashboard and activity permissions

Enables all users to view dashboards. Activity permissions enable users to view, manage, and schedule bot activities.

### Dashboard and Activity Permissions

| Permission ID | Action                     | Resource Type  | Description                                                                                                                                                                               |
|---------------|----------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 120           | view                       | dashboard      | View dashboard.<br> Note: All roles have this permission by default.                                   |
| 58            | myschedule                 | taskscheduling | All users can view their own activity.<br> Note: All roles have this permission by default.            |
| 51            | managemyschedule           | taskscheduling | All users can pause, resume, or cancel their own activity and move their finished activities to history.                                                                                  |
| 52            | manageeveryoneschedules    | taskscheduling | A user can monitor ongoing automations where a user has either run or schedule access on the respective bot. The user can monitor and manage ongoing automations.                         |
| 28            | view                       | taskscheduling | Users can see their scheduled bots regardless of which user scheduled the bot.                                                                                                            |
| 10            | addschedule                | taskscheduling | It requires permission to view and manage Bot Runners.                                                                                                                                    |
| 5             | updateschedule             | taskscheduling | Users can edit their scheduled bots, even if the bots are scheduled by a different user.                                                                                                  |
| 11            | deleteschedule             | taskscheduling | Users can delete schedules for any of their bots regardless of which users scheduled the bot.                                                                                             |
| 53            | manageallmyfolderschedules | taskscheduling | Users can view, edit, and delete all the schedules on the bot folders that the user has access to. This includes the schedules that the user created or schedules created by other users. |



| Permission ID | Action             | Resource Type  | Description                                                                                                                                              |
|---------------|--------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6             | manageallschedules | taskscheduling | Users can view, edit, and delete all the schedules in the system. This includes the schedules that the user created or schedules created by other users. |

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Devices permissions

Enable users to register, view, and manage devices used to run bots.

| Permission ID | Action   | Resource Type | Description                                                                                                                                                                                                                     |
|---------------|----------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 97            | register | devices       | Allows users to register a localhost device.                                                                                                                                                                                    |
| 118           | all      | devices       | Allows users to view and manage all devices in the Enterprise Control Room.                                                                                                                                                     |
| 119           | delete   | devices       | Allows users to delete devices that they registered.                                                                                                                                                                            |
| 1191          | edit     | devices       | Allows users to edit the devices that they have permission to see.                                                                                                                                                              |
| 30            | view     | devices       | Allows users to view and manage Bot Creators, Bot Runners, and device pools.<br><br> <u>Note: All roles have this permission by default.</u> |
| 40            | create   | pool          | Allows users to create and manage their own device pools.                                                                                                                                                                       |



Note: A user with the `AAE_Pool_Admin` role is able to manage all device pools in the Enterprise Control Room. See [System-created roles](#) on page 1275.

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Discovery Bot permissions

Enable users to view or manage Discovery Bot processes, recordings, aggregations, and opportunities.

### Process permissions

| Permission ID | Action         | Resource Type    | Description                                                                                                                                                                                                                                              |
|---------------|----------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 109           | viewprocess    | processdiscovery | Allows users to view assigned processes.<br> Note: This is the standard permission. You must assign this permission before assigning any process discovery permissions. |
| 110           | viewallprocess | processdiscovery | Allows users to view all the defined processes.                                                                                                                                                                                                          |
| 108           | editprocess    | processdiscovery | Allows users to create and edit processes.                                                                                                                                                                                                               |

### Recording permissions

| Permission ID | Action           | Resource Type    | Description                                                                                                                                                                                                           |
|---------------|------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 102           | viewrecording    | processdiscovery | Allows users to view their own recording.<br> Note: You must assign this permission before assigning any of the permissions below. |
| 112           | createrecording  | processdiscovery | Allows users to run recorder and create recording.                                                                                                                                                                    |
| 103           | editrecording    | processdiscovery | Allows users to edit their own recording.                                                                                                                                                                             |
| 104           | deleterecording  | processdiscovery | Allows users to delete their own recording.                                                                                                                                                                           |
| 111           | viewallrecording | processdiscovery | Allows users to view all recordings.                                                                                                                                                                                  |

### Aggregation permissions

| Permission ID | Action                 | Resource Type    | Description                                  |
|---------------|------------------------|------------------|----------------------------------------------|
| 291           | viewmanualaggregations | processdiscovery | Allows users to view their own aggregations. |
| 293           | viewallaggregations    | processdiscovery | Allows users to view all aggregations.       |

| Permission ID | Action                         | Resource Type    | Description                                     |
|---------------|--------------------------------|------------------|-------------------------------------------------|
| 290           | createdeletemanualaggregations | processdiscovery | Allows users to create and delete aggregations. |
| 294           | updatemanualaggregations       | processdiscovery | Allows users to update aggregations.            |
| 292           | viewssystemaggregations        | processdiscovery | Allows users to view system aggregations.       |

## Opportunity permissions

| Permission ID | Action                  | Resource Type    | Description                                                                                                                                                                                                                                     |
|---------------|-------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 105           | viewopportunity         | processdiscovery | Allows users to view opportunities within assigned process.<br><br> Note: You must assign this permission before assigning any of the opportunity permissions. |
| 296           | viewalloppportunity     | processdiscovery | Allows users to view all opportunities.                                                                                                                                                                                                         |
| 295           | createdeleteopportunity | processdiscovery | Allows users to create and delete opportunities within the assigned process.                                                                                                                                                                    |
| 107           | converttobot            | processdiscovery | Allows users to convert an opportunity to a bot.                                                                                                                                                                                                |
| 622           | exportopportunity       | processdiscovery | Allows users to export an opportunity.                                                                                                                                                                                                          |

### Related tasks

[Create a new role API](#) on page 1255

Use `Create role API` to create a new role with permissions in the Enterprise Control Room.

### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Event triggers permissions

Enable users to run bots automatically depending on a specific event, such as a new window opening. You can limit users ability to only view or to view and manage triggers.

| Permission ID | Action | Resource Type | Description                                     |
|---------------|--------|---------------|-------------------------------------------------|
| 121           | view   | eventtriggers | Allows users to view event triggers.            |
| 122           | manage | eventtriggers | Allows users to view and manage event triggers. |

### Related tasks

[Create a new role API](#) on page 1255

Use `Create role API` to create a new role with permissions in the Enterprise Control Room.

### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## IQ Bot permissions

Enable users to view IQ Bot permissions, create and manage learning instances, import and export domains, and manage IQ Bot configuration settings and migration.

### IQ Bot permissions

| Permission ID | Action    | Resource Type | Description                                                                                                                                                                                                                                            |
|---------------|-----------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 69            | viewiqbot | iqbot         | <p>Allows users to view the default dashboards in the IQ Bot portal.</p> <p> Note: You must assign this permission before assigning any of the permissions below.</p> |

### Learning instance permissions

| Permission ID | Action                            | Resource Type        | Description                                                                                                                                                                                                                                                          |
|---------------|-----------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 70            | viewlearninginstance              | viewiqbot            | <p>Allows users to view their learning instances in the IQ Bot portal.</p> <p> Note: You must assign this permission before assigning any other learning instance permission.</p> |
| 79            | viewlearninginstancefromsignature | viewlearninginstance | Allows users to view learning instances created by other users with the same role in the IQ Bot portal.                                                                                                                                                              |
| 80            | viewalllearninginstances          | viewlearninginstance | Allows users to view all learning instances in the IQ Bot portal.                                                                                                                                                                                                    |
| 73            | launchvalidation                  | viewlearninginstance | Allows users to access the IQ Bot Validator to review and update documents with exceptions.                                                                                                                                                                          |
| 74            | createlearninginstance            | viewlearninginstance | Allows users to create learning instances in the IQ Bot portal.                                                                                                                                                                                                      |
| 75            | editlearninginstance              | viewlearninginstance | Allows users to edit learning instances in the IQ Bot portal.                                                                                                                                                                                                        |
| 76            | deletelearninginstance            | viewlearninginstance | Allows users to delete their learning instances in the IQ Bot portal.                                                                                                                                                                                                |
| 77            | sendlearninginstancestoproduction | viewlearninginstance | Allows users to send their learning instances to production in the IQ Bot portal.                                                                                                                                                                                    |

| Permission ID | Action                      | Resource Type              | Description                                                                |
|---------------|-----------------------------|----------------------------|----------------------------------------------------------------------------|
| 78            | trainlearninginstancegroups | viewlearninginstancegroups | Allows users to train their learning instance groups in the IQ Bot portal. |

### Domains permissions

| Permission ID | Action        | Resource Type | Description                                                                                                                                                                                                                          |
|---------------|---------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 71            | viewdomain    | viewiqbot     | Allows users to view all domains in the IQ Bot portal.<br><br> Note: You must assign this permission before assigning any other domain permissions. |
| 81            | createdomains | viewdomain    | Allows users to create domains in the IQ Bot portal.                                                                                                                                                                                 |
| 84            | importdomains | viewdomain    | Allows users to import domains in the IQ Bot portal.                                                                                                                                                                                 |
| 85            | exportdomains | viewdomain    | Allows users to export domains in the IQ Bot portal.                                                                                                                                                                                 |

### Administration permissions

| Permission ID | Action                             | Resource Type      | Description                                                                                                                                                                                                                                                 |
|---------------|------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 72            | viewadministration                 | viewiqbot          | Allows users to access the Administration tab in the IQ Bot portal.<br><br> Note: You must assign this permission before assigning any other administration permissions. |
| 86            | viewandmanageadvancedconfiguration | viewadministration | Allows users to manage the IQ Bot portal advanced configuration settings.                                                                                                                                                                                   |
| 87            | viewandmanagemigration             | viewadministration | Allows users to access the migration utility to import and export learning instances in the IQ Bot portal.                                                                                                                                                  |

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## MetaBot permission

MetaBots are obsolete in Enterprise A2019. However, this permission is valid to ensure that all functionality previously available is supported in Enterprise A2019.

Access to MetaBot Designer

Permission/feature ID is not available.

Bot Creator users can access MetaBot Designer to view, create, and update MetaBots.



Note: This feature is available for internal use only.

Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Package manager permissions

Enable users to view and manage packages.

| Permission ID | Action | Resource Type  | Description                               |
|---------------|--------|----------------|-------------------------------------------|
| 92            | view   | packagemanager | Allows users to view packages.            |
| 93            | manage | packagemanager | Allows users to view and manage packages. |

Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Workload permissions

Enable users to create and manage workitems, workitem models, queues, and automations in the Enterprise Control Room.

| Permission ID | Action     | Resource Type  | Description                                                        |
|---------------|------------|----------------|--------------------------------------------------------------------|
| 58            | myschedule | taskscheduling | Allows users to view and manage their own schedules.               |
| 41            | create     | queue          | Allows users to create and manage their own queues.                |
| 42            | calculate  | sla            | Allows users to calculate workload Service Level Agreements (SLA). |



Note: A user with the `AAE_Queue_Admin` role has all the above permissions. In addition, the `AAE_Queue_Admin` is able to manage all the queues in the Enterprise Control Room. See [System-created roles](#) on page 1275.

#### Related tasks

[Create a new role API](#) on page 1255

Use `Create_role` API to create a new role with permissions in the Enterprise Control Room.

#### Related reference

[Roles and permissions](#) on page 1274

Assign roles from the Enterprise A2019 Administration user interface or through the User Management API to enable users to access features. You can assign a system-created role or create a custom role with specific permissions.

## Workload Management API

Use the Workload Management (WLM) API to programmatically manage and create Work Item models, queues, Work Items, and automations in your Enterprise Control Room.



Note: You can view the [Control Room APIs](#) in the Community Edition, but API functionality is limited. You need a licensed Enterprise A2019 Edition to access the full functionality of the APIs.

### Prerequisites

To create a [Workload Management](#) automation process, ensure that you are allocated the following roles and permissions:

- `AAE_Pool_Admin` role and `View all devices` permission
- `AAE_Queue_Admin` role or `Create queues` permission
- `Run bot` permission
- `Run or schedule` permission on the bots folder
- `Device pool consumer` permission

### Create workload automation

#### 1. [Authenticate the user.](#)

Use the POST method to generate an authentication JSON Web Token.

#### 2. Create WLM queues:

- a. [Create Work Item model API](#) on page 1291
- b. [Create queues API](#) on page 1292
- c. [Add queue owner or member API](#) on page 1294
- d. [Add queue participants API](#) on page 1295
- e. [Add queue consumer API](#) on page 1296
- f. [Add Work Items to the queue API](#) on page 1298

#### 3. [Create device pool API](#) on page 1219

#### 4. [Run bot with queue API](#) on page 1299

### Retrieve WLM entities using list APIs

When you create WLM queues for workload automation (see previous section), you can use the Workload Management list APIs to retrieve a list of WLM entities such as Work Item models, queues, and Work Items in queues associated with the Enterprise Control Room.

[Workload Management list APIs](#) on page 1301

### Create Work Item model API

Define a Work Item structure (model) for processing in a queue. This enables you to manually upload the Work Item from the system in the absence of ready data in a file.

You must have the following:

- Create queues or AAE\_Queue Admin permission
- The endpoint URL: <your\_control\_room\_url>/v3/wlm/workitemmodels

1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/workitemmodels.

Enter the parameters such as Work Item model name, attribute names, and type value in the request body to create a Work Item structure. The value of type can be TEXT, NUMBER, or DATE, depending on the attribute value format.

For example:

```
POST https://192.0.2.0/v3/wlm/workitemmodels
```

In this example, the Work Item model name is Finance-template and it includes the first\_name, last\_name, and email as attributes. For these attributes, use TEXT value as the type parameter.

Request body:

```
{
 "name": "Finance-template",
 "attributes": [
 {
 "name": "first_name",
 "type": "TEXT"
 },
 {
 "name": "last_name",
 "type": "TEXT"
 },
 {
 "name": "email",
 "type": "TEXT"
 }
]
}
```

2. Send the request.

When the request is successful, the Work Item model id and the display column id are returned in the response. You will use these IDs when you create queues.



In this example, the response body returns the Work Item model id as 10 and the display column id as 59, 60, 61 for the `first_name`, `last_name`, and `email`, respectively.

Response body:

```
{
 "id": 10,
 "createdBy": 24,
 "createdOn": "2020-05-26T06:14:27.520336200Z",
 "updatedBy": 24,
 "updatedOn": "2020-05-26T06:14:27.520336200Z",
 "tenantId": 1,
 "version": 0,
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c",
 "name": "fin",
 "attributes": [
 {
 "id": 59,
 "name": "first_name",
 "type": "TEXT"
 },
 {
 "id": 60,
 "name": "last_name",
 "type": "TEXT"
 },
 {
 "id": 61,
 "name": "email",
 "type": "TEXT"
 }
]
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Create queues

Related tasks

[List Work Item models](#) on page 1301

Use the Work Item model list API to get the list of all the Work Item templates that are associated with the specified Enterprise Control Room.

## Create queues API

A queue is one of the main building blocks of workload management (WLM). It holds specific sets of data that your bot is expecting for automation.

Ensure you have the following:

- Create queues or AAE\_Queue Admin permission
- The endpoint URLs:
  - `<your_control_room_url>/v3/wlm/queues`
  - `<your_control_room_url>/v3/wlm/workitemmodels/list`

1. Use the POST method and endpoint URL: `<your_control_room_url>/v3/wlm/queues`.

Enter values for the following parameters to create a queue. Use the same `workItemModelId` and `displayColumnIds` that you received in response when you created the Work Item model.



Note: If you want to search or get a list of all the available `workItemModelId`, use the endpoint URL `<your_control_room_url>/v3/wlm/workitemmodels/list`.

[List WLM queues](#) on page 1302

For example:

```
POST https://192.0.2.0/v3/wlm/queues
```

In this example, use `workItemModelId` as 10 and `displayColumnIds` as 59, 60, 61.

Request body:

```
{
 "name": "Finance-Q",
 "description": "Queue for Finance",
 "reactivationThreshold": 1,
 "displayColumns": [
 "first_name",
 "last_name",
 "email"
],
 "workItemProcessingOrders": [
],
 "workItemModelId": 10,
 "displayColumnIds": [
 59,
 60,
 61
]
}
```

## 2. Send the request.

When the request is successful, a queue id is returned in the response body. This queue id will be used in the subsequent tasks when you add owners, participants, consumers, and Work Items in the queue.

In this example, the response body returns the queue id as 17.

Response body:

```
{
 "id": "17",
 "createdBy": "24",
 "createdOn": "2020-05-26T06:13:57.644499300Z",
 "updatedBy": "24",
 "updatedOn": "2020-05-26T06:13:57.644499300Z",
 "tenantId": "1",
 "version": "0",
 "tenantUuid": "4db5b56c-5c2b-4aee-8ca0-f53ec241563c",
 "name": "Finance-Q",
 "description": "Queue for Finance",
 "reactivationThreshold": "1",
 "status": "NOT_IN_USE",
 "manualProcessingTime": "0",
 "manualProcessingTimeUnit": "",
 "workItemProcessingOrders": [
]
}
```

```

],
 "workItemModelId": "10",
 "displayColumnIds": [
 "59",
 "60",
 "61"
],
 "considerReactivationThreshold": false
 }
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

### Add queue owner or member

Related tasks

[List WLM queues](#) on page 1302

Use the Workload Management queues list API to get the list of all the queues that are associated with the specified Enterprise Control Room.

## Add queue owner or member API

Add queue owners who can create, edit, and view queues. The queue creator is the default queue owner and can add other Enterprise Control Room users as queue owners if required.

You must have the following:

- Create queues or AAE\_Queue Admin permission
- The endpoint URLs:
  - <your\_control\_room\_url>/v3/wlm/queues/{queueId}/members/{userId}
  - <your\_control\_room\_url>/v1/usermanagement/users/list
  - <your\_control\_room\_url>/v3/wlm/queues/list

1. Use the PUT method and endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/members/{userId}.

Enter the queueId to which you want to add the owner and the userId that will be the owner of the queue. This queueId is the same ID that was returned when you created the queue.



Note:

- If you want to search or get a list of all the available queueId, use the endpoint URL <your\_control\_room\_url>/v3/wlm/queues/list.  
[List WLM queues](#) on page 1302
- If you want to search or get a list of all the userId, use the endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/list.  
[Search for users API](#) on page 1268

For example, use queueId as 17 and userId as 1.

```
PUT https://192.0.2.0/v3/wlm/queues/17/members/1
```

Add one or more permissions in the request body to allow the user to perform the specific queue actions. In this example, manage and own permissions are added.

Request body:

```
{
 "permissions": [
 "manage",
 "own"
]
}
```

2. Send the request.

When the request is successful, the required user is added as a queue owner.

In this example, the user with userId as 1 is added as a queue owner.

Response body:

```
{
 "id": 1,
 "permissions": [
 "own",
 "manage"
]
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

### Add queue participants

## Add queue participants API

Add queue participants from different roles defined in the Enterprise Control Room.

You must have the following:

- Create queues or AAE\_Queue Admin permission
- The endpoint URLs:
  - <your\_control\_room\_url>/v3/wlm/queues/{queueId}/participants
  - <your\_control\_room\_url>/v3/wlm/queues/list

1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/participants.

Enter the queueId to which you want to add the participants. This queueId is the same ID that was returned when you created the queue.



Note: If you want to search or get a list of all the available queueId, use the endpoint URL <your\_control\_room\_url>/v3/wlm/queues/list.

[List WLM queues](#) on page 1302

For example, use queueId as 17.

```
POST https://192.0.2.0/v3/wlm/queues/17/participants
```

Enter one or more role id in the request body that you want to add as queue participants. In this example, one role id as 21 is added as queue participant.

Request body:

```
[
 {
 "id": 21
 }
]
```

2. Send the request.

When the request is successful, the participants are added to the queue.

In this example, the participant with role id as 21 is added to the queue.

Response body:

```
[
 {
 "id": 21,
 "createdBy": null,
 "createdOn": null,
 "updatedBy": null,
 "updatedOn": null,
 "tenantId": null,
 "version": 0,
 "tenantUuid": null,
 "description": null,
 "name": null,
 "accessRestriction": null,
 "permissions": [
],
 "countPrincipals": 0,
 "principals": [
]
 }
]
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

### Add queue consumer

## Add queue consumer API

Add queue consumers from different roles defined in the Enterprise Control Room.

You must have the following:

- Create queues or AAE\_Queue Admin permission
  - The endpoint URLs:
    - <your\_control\_room\_url>/v3/wlm/queues/{queueId}/consumers
    - <your\_control\_room\_url>/v3/wlm/queues/list
1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/consumers.  
Enter the queueId to which you want to add the consumers. This queueId is the same ID that was returned when you created the queue.



Note: If you want to search or get a list of all the available queueId, use the endpoint URL `<your_control_room_url>/v3/wlm/queues/list`.

[List WLM queues](#) on page 1302

For example, use queueId as 17.

```
POST https://192.0.2.0/v3/wlm/queues/17/consumers
```

Enter one or more role id in the request body that you want to add as queue consumers. In this example, one role id as 21 is added as queue consumer.

Request body:

```
[
 {
 "id": 21
 }
]
```

2. Send the request.

When the request is successful, the consumers are added to the queue.

In this example, the consumer with role id as 21 is added to the queue.

Response body:

```
[
 {
 "id": 21,
 "createdBy": null,
 "createdOn": null,
 "updatedBy": null,
 "updatedOn": null,
 "tenantId": null,
 "version": 0,
 "tenantUuid": null,
 "description": null,
 "name": null,
 "accessRestriction": null,
 "permissions": [
],
 "countPrincipals": 0,
 "principals": [
]
 }
]
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

[Add Work Items to the queue](#)

## Add Work Items to the queue API

Add or insert Work Items to an existing queue in the Enterprise Control Room per the defined model or structure.

- The user must be a Queue owner and participant
  - You must have the endpoint URLs:
    - <your\_control\_room\_url>/v3/wlm/queues/{queueId}/workitems
    - <your\_control\_room\_url>/v3/wlm/queues/list
1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/workitems.

Enter the queueId to which you want to add a Work Item in the queue.



Note: If you want to search or get a list of all the available queueId, use the endpoint URL <your\_control\_room\_url>/v3/wlm/queues/list.

[List WLM queues](#) on page 1302

For example, use queueId as 17.

```
POST https://192.0.2.0/v3/wlm/queues/17/workitems
```

Enter one or more workitems in the request body. To add multiple Work Items, call the API in a loop.

Request body:

```
{
 "workItems": [
 {
 "json": {
 "first_name": "Jane",
 "last_name": "Doe",
 "email": "jane.doe@example.com"
 }
 }
]
}
```

2. Send the request.

When the request is successful, a unique Work Item id is returned in the response body and the Work Items are added to the queue per the defined Work Item model or structure.

In this example, the Work Item with the first\_name as Jane, last\_name as Doe, and email as jane.doe@example.com is added to the queue based on the defined structure.

Response body: (truncated output)

```
{
 "id": 77,
 "createdBy": 24,
 "createdOn": "2020-05-19T17:41:57.602092100Z",
 "updatedby": 24,
 "updatedOn": "2020-05-26T09:13:31.090241700Z",
 "version": 2,
 "json": {
 "first_name": "Jane",
 "last_name": "Doe",
 "email": "jane.doe@example.com"
 }
}
```

```

 },
 "result": "",
 "deviceId": 0,
 "status": "NEW",
 "col1": "1.0",
 "col2": "",
 ...
 "co21": "",
 "deviceUserId": 0,
 "queueId": 5,
 "comment": "",
 "automationId": 0,
 "totalPausedTime": 0,
 "error": ""
 }
}

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

### Create an automation to run a bot with a queue

#### Related tasks

[List Work Items in queue](#) on page 1305

Use the Workload Management Work Item list API to get the list of all the Work Items in the queues that are associated with the specified Enterprise Control Room.

## Run bot with queue API

Create an automation to collectively process all the Work Items of a queue across all the Bot Runners present in one or more device pools using the API.

- You must have the following permissions:
    - Run bot
    - Run or schedule permission on the bot folder
    - Queue consumer
    - Device pool consumer
  - You must have the endpoint URLs:
    - <your\_control\_room\_url>/v3/wlm/automations
    - <your\_control\_room\_url>/v1/usermanagement/users/list
    - <your\_control\_room\_url>/v3/wlm/queues/list
    - <your\_control\_room\_url>/v2/devices/pools/list
1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/automations. Enter parameters such as name of the automation, fileId, filename, queueId, queueName, runAsUserIds, and poolId.
    - If you want to search or get a list of all the available queueId, use the endpoint URL <your\_control\_room\_url>/v3/wlm/queues/list.  
[List WLM queues](#) on page 1302
    - If you want to search or get a list of all the runAsUserIds, use the endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/list.  
[Search for users API](#) on page 1268
    - If you want to search or get a list of all the poolId, use the endpoint URL: <your\_control\_room\_url>/v2/devices/pools/list.



[List device pools API](#) on page 1217

In this example, the parameters are entered as follows:

- Automation name as Finance-RPA-Run
- Bot fileName as wlmql
- runAsUserIds as 4 and 5 that will log in to the device to run the automation
- queueId as 17, associated with the queue to run the automation
- poolId as 1 that is associated with the pool

Request body:

```
{
 "name": "Finance-RPA-Run",
 "automationName": "Finance-RPA-Run",
 "fileName": "wlmql",
 "botInput": {
 },
 "status": "ACTIVE",
 "description": "WLM for Finance",
 "rdpEnabled": false,
 "setAsDefaultDevice": false,
 "poolIds": [
],
 "workspaceName": "public",
 "timeZone": "Asia/Calcutta",
 "runAsUserIds": [
 "4",
 "5"
],
 "queueId": "17",
 "poolId": "1"
}
```

## 2. Send the request.

When the request is successful, a unique automation id is returned in the response body after the WLM automation run successfully. The details of the associated queue name and ID, and the user name IDs for which the automation is run are also provided.

In this example, the response body returns the unique automation id as 12.

Response body:

```
{
 "id": "12",
 "name": "Finance-RPA-Run",
 "status": "ACTIVE",
 "description": "WLM for Finance",
 "rdpEnabled": false,
 "priority": "1",
 "queueId": "17",
 "queueName": "Finance-Q",
 "poolId": "1",
 "runAsUserIds": [
 "4",
 "5"
],
 "fileId": "17",
 "startedOn": "2020-05-26T09:42:51.958893800Z",
}
```

```

 "startedBy": "24",
 "createdBy": "24",
 "createdOn": "2020-05-26T09:42:51.958893800Z",
 "updatedBy": "24",
 "updatedOn": "2020-05-26T09:42:51.958893800Z",
 "tenantId": "1",
 "version": "0",
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c"
 }

```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#) on page 1314.

## Workload Management list APIs

List APIs use the POST method to return the list of the entities. You can use the Workload Management (WLM) list APIs and get the list of WLM entities, for example, Work Item models, queues, and Work Items in the queues.

Use the following Workload Management APIs to get the list of the WLM entities:

- [List Work Item models](#) on page 1301
- [List WLM queues](#) on page 1302
- [List Work Items in queue](#) on page 1305

## List Work Item models

Use the Work Item model list API to get the list of all the Work Item templates that are associated with the specified Enterprise Control Room.

You must have the following:

- Queue Consumer permission
- An authentication token for a user registered in the Enterprise Control Room
- [Authentication API](#)
- The endpoint URL: `<your_control_room_url>/v3/wlm/workitemmodels/list`

1. Use the POST method to generate an authentication JSON Web Token.

[Authentication API](#)

2. Use the POST method and endpoint URL: `<your_control_room_url>/v3/wlm/workitemmodels/list`.  
Use the following URL and leave the request body blank to request information about all available Work Item models:

```
https://192.0.2.0/v3/wlm/workitemmodels/list
```

Request body:

```
{ }
```

3. Send the request.
  - In the REST Client, click SEND.
  - In the Swagger interface, click Execute.

Because there is no filtering used in the request, a successful response returns all of the queues for the specified Enterprise Control Room. In this example, the response returned data for two Work Item models.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 50,
 "totalFilter": 50
 },
 "list": [
 {
 "id": "1",
 "name": "q1",
 "attributes": [
 {
 "name": "Customer Name",
 "type": "TEXT",
 "id": "2"
 },
 {
 "name": "email",
 "type": "TEXT",
 "id": "4"
 }
]
 },
 {
 "id": "2",
 "name": "q2",
 "attributes": [
 {
 "name": "Customer Name",
 "type": "TEXT",
 "id": "7"
 },
 {
 "name": "email",
 "type": "TEXT",
 "id": "9"
 }
]
 }
]
}
```

Related tasks

[Create Work Item model API](#) on page 1291

Define a Work Item structure (model) for processing in a queue. This enables you to manually upload the Work Item from the system in the absence of ready data in a file.

## List WLM queues

Use the Workload Management queues list API to get the list of all the queues that are associated with the specified Enterprise Control Room.

You must have the following:

- Queue Consumer permission
- An authentication token for a user registered in the Enterprise Control Room

### Authentication API

- The endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/list

Leave the request body blank to request information on all available queues. Add one or more filter parameters in the request body to limit the information returned from all available WLM queues.

Supported filterable parameters:

id

The numeric identifier for a queue.

- Field: id
- Type: integer

```
{
 "filter": {
 "operator": "eq",
 "value": "7",
 "field": "id"
 }
}
```

name

The name of the queue.

- Field: name
- Type: string

```
{
 "filter": {
 "operator": "substring",
 "value": "Finance",
 "field": "name"
 }
}
```

status

The status of queue for example: Draft, In use, or Not in use.

- Field: status
- Type: string

```
{
 "filter": {
 "operator": "eq",
 "value": "IN_USE",
 "field": "status"
 }
}
```

- Use the POST method to generate an authentication JSON Web Token.  
[Authentication API](#)
- Use the POST method and end point URL: <your\_control\_room\_url>/v3/wlm/queues/list  
For example, use the following Enterprise Control RoomURL:

```
https://192.0.2.0/v3/wlm/queues/list
```

Use filters in the request body to retrieve the list of all the queues that are `IN_USE` status and have `Finance` in their name.

Request body:

```
{
 "sort": [
 {
 "field": "name",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "eq",
 "value": "IN_USE",
 "field": "status"
 },
 {
 "operator": "substring",
 "value": "Finance",
 "field": "name"
 }
]
 },
 "fields": [
],
 "page": {
 "offset": 0,
 "total": 14,
 "totalFilter": 10,
 "length": 100
 }
}
```

3. Send the request.

- In the REST Client, click **SEND**.
- In the Swagger interface, click **Execute**.

The response returns all the details of the queue that has `Finance` in their name and `IN_USE` as status.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 14,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "12",
 "createdBy": "24",
 "createdOn": "2020-05-19T18:37:11.713311Z",
 "updatedBy": "24",
 "updatedOn": "2020-05-19T19:14:13.641004200Z",
 "tenantId": "1",
 "version": "11",

```

```

"tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c",
"name": "Finance_WLM",
"description": "Finance WLM Automation",
"reactivationThreshold": "1",
"status": "IN_USE",
"manualProcessingTime": "0",
"manualProcessingTimeUnit": "SECONDS",
"workItemProcessingOrders": [
 {
 "columnId": "37",
 "priority": "1",
 "name": "",
 "sortDirection": "desc",
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c"
 },
 {
 "columnId": "38",
 "priority": "2",
 "name": "",
 "sortDirection": "asc",
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c"
 },
 {
 "columnId": "39",
 "priority": "3",
 "name": "",
 "sortDirection": "desc",
 "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c"
 }
],
"workItemModelId": "7",
"displayColumnIds": [
 "36",
 "37",
 "38",
 "39",
 "40"
],
"considerReactivationThreshold": false
}
]
}

```

#### Related tasks

[Create queues API](#) on page 1292

A queue is one of the main building blocks of workload management (WLM). It holds specific sets of data that your bot is expecting for automation.

## List Work Items in queue

Use the Workload Management Work Item list API to get the list of all the Work Items in the queues that are associated with the specified Enterprise Control Room.

You must have the following:

- Queue Consumer permission
- An authentication token for a user registered in the Enterprise Control Room

#### [Authentication API](#)

- The endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/workitems/list

Leave the request body blank to request information on all available Work Items. Add one or more filter parameters in the request body to limit the information returned from all available WLM Work Items.

Supported filterable parameters:

status

The status of queue for example: New, On hold, Failed, Completed, Data error, Active, and Ready to run.

- Field: status
- Type: string

```
{
 "filter": {
 "operator": "eq",
 "value": "ACTIVE",
 "field": "status"
 }
}
```

result

The Work Item result string. For example, the Work Item was completed or skipped.

- Field: result
- Type: string

```
{
 "filter": {
 "operator": "substring",
 "value": "skipped",
 "field": "result"
 }
}
```

col

The column number corresponding to the custom column name. For example, email, firstname, and lastname.

- Field: col
- Type: string

```
{
 "filter": {
 "operator": "substring",
 "value": "Brian",
 "field": "col1"
 }
}
```

1. Use the POST method to generate an authentication JSON Web Token.  
[Authentication API](#)
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v3/wlm/queues/{queueId}/workitems/list  
For example, enter the queueId as 20 in the following URL for which you want to get the Work Items:

```
https://192.0.2.0/v3/wlm/queues/20/workitems/list
```

Use filters in the request body to retrieve the list of all the Work Items that are in NEW status and have Brian in their first\_name (coll).

Request body:

```
{
 "sort": [
 {
 "field": "computedStatus",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "eq",
 "value": "NEW",
 "field": "status"
 },
 {
 "operator": "substring",
 "value": "Brian",
 "field": "coll"
 }
]
 },
 "fields": [
],
 "page": {
 "offset": 0,
 "total": 5,
 "totalFilter": 1,
 "length": 100
 }
}
```

3. Send the request.

- In the REST Client, click SEND.
- In the Swagger interface, click Execute.

The response returns all the details of the Work Item that has Brian in their first\_name (coll) and status is NEW.

Response body:

```
{
 "page": {
 "offset": 0,
 "total": 5,
 "totalFilter": 1
 },
 "list": [
 {
 "id": "11804",
 "createdBy": "24",
 "createdOn": "2020-05-26T10:19:34.786711300Z",
 "updatedBy": "24",
 "updatedOn": "2020-05-26T10:19:34.786711300Z",
 "version": "1",
 "json": {
```



```

 "id": "1",
 "first_name": "Brian",
 "last_name": "Matthews",
 "email": "bmatthews0@example.com",
 "gender": "Male",
 "Address": "5773 Meadow Ridge Street",
 "Current Balance": "822034.72",
 "Current Card Type": "jcb",
 "Average Bank Balance": "$1,25,365.58 ",
 "Account Number": "1651249",
 "Amount Requested": "12750",
 "Recommended": "6375",
 "Phone": "8607826062"
 },
 "result": "",
 "deviceId": "0",
 "status": "NEW",
 "col1": "Brian",
 "col2": "Matthews",
 "col3": "bmatthews0@example.com",
 "col4": "",
 "col5": "",
 "deviceUserId": "0",
 "queueId": "20",
 "comment": "",
 "automationId": "0",
 "totalPausedTime": "0",
 "error": "",
 "col6": "",
 "col7": "",
 "col8": "",
 "col9": "",
 "col10": ""
}
]
}

```

Related tasks

[Add Work Items to the queue API](#) on page 1298

Add or insert Work Items to an existing queue in the Enterprise Control Room per the defined model or structure.

## Filters in an API request body

Filtering provides basic conditional queries and page control for processing API requests. There are three basic components to filtering: conditions, sorting, and pagination parameters.

Here is a representation of the JSON filtering structure used in the Automation Anywhere APIs.

```

{
 "filter": {
 "operator": "NONE",
 "operands": [
 null
],
 "field": "string",
 "value": "string"
 },
 "sort": [
 {

```

```

 "field": "string",
 "direction": "asc"
 }
],
 "page": {
 "offset": 0,
 "length": 0
 }
}

```

The most basic part of this JSON object is the filter array.

## Understanding filters

### Basic filter

Filters can be used search for a single condition or they can be wrapped in logical operands AND and OR. Filtering can be a simple conditional evaluation of a single field. The operator, field, and value used in a filter are specific to the API they are used in.



Note: Values in the angle brackets < > include a list of all potential values. There should be only one value for each parameter.

### Single parameter filter

```

{
 "filter": {
 "operator":
 "<NONE, lt, le,
 eq, ne, ge, gt,
 substring, and,
 or, not>",
 "field":
 "string",
 "value":
 "string"
 }
}

```

### Two parameter filter

```

{
 "filter": {
 "operator":
 "<and, or>",
 "operands":
 [
 {
 "operator":
 "<NONE, lt, le,
 eq, ne, ge, gt,
 substring, and,
 or, not>",
 "field":
 "string",
 "value":
 "string"
 },

```

```

 {
 "operator":
 "<NONE, lt, le,
 eq, ne, ge, gt,
 substring, and,
 or, not>",
 "field":
 "string",
 "value":
 "string"
 }
]
}

```

## Page

```

"page": {
 "offset": 0,
 "length": 0
}

```

### Pagination rules parameters

- Offset:  
Type: integer  
The numeric value that indicates how many rows into a table that the filter starts evaluating.
- Length  
Type: integer  
The number of lines that are returned in a single page of results.

## Sort

```

"sort": [
 {
 "field": "string",
 "direction": "<asc, desc>"
 }
]

```

- Field: The field that you want the results to be filtered by. This must be a supported filterable field. Filterable fields vary depending on the API.
- Direction  
Type: Enum [ desc, asc ]
  - asc = ascending (smallest to largest, 0 to 9, A to Z)
  - desc = descending (largest to smallest, 9 to 0, Z to A)

## API filter examples

[User management filter example](#) on page 1311

This example filter is based on the User Management API fields and parameters. This filter searches for the user's login name, username, and the user's real name, firstName.

[Repository management filter example](#) on page 1312

This example filter is based on the Repository Management API fields and parameters. This filter example searches on the bot status and name.

[Migration list results filter example](#) on page 1313

This example filter is based on the Migration API fields and parameters. This filter searches for migrations that contain a specific string in the name and was started, updatedOn, between two dates.

## User management filter example

This example filter is based on the User Management API fields and parameters. This filter searches for the user's login name, username, and the user's real name, firstName.

This filter searches for the string "bot-creator" in the username field and the string "Adweta" in the firstName field.

```
{
 "sort": [
 {
 "field": "username",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "substring",
 "value": "bot-creator",
 "field": "username"
 },
 {
 "operator": "substring",
 "value": "Adweta",
 "field": "firstName"
 }
]
 }
}
```

sort

- field: the name of the field used to sort the response.
- direction: the sort order. It can be asc, ascending, or desc, descending.

filter

Filter consists for an operator, value, and field. Filters are operands when used in conjunction with a boolean operator, such as and.

- operands: filters are used as operands when combined in a filter by using a boolean operator. There are two available boolean operators:
  - or: one of the conditions must be met.
  - and: all of the conditions must be met.
- operator: there are 11 operators NONE, lt, le, eq, ne, ge, gt, substring, and, or, not. And and or are used to evaluate multiple filters together. The other operators are used to evaluate values within individual filters. Not all operators work with all fields.
- field: the name of the field used in the filter.
- value: the value of the field to be evaluated.

## Repository management filter example

This example filter is based on the Repository Management API fields and parameters. This filter example searches on the bot status and name.

This filter searches for bots in the Enterprise Control Room repository with the string "finance" in the name of the file that have a status of "CHECKED\_OUT."



Note: The Repository management API uses role based access. That means users can only see the files and folders to which they have access.

```
{
 "sort": [
 {
 "field": "directory",
 "direction": "desc"
 },
 {
 "field": "name",
 "direction": "asc"
 }
],
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "substring",
 "value": "finance",
 "field": "name"
 },
 {
 "operator": "eq",
 "value": "CHECKED_OUT",
 "field": "botStatus"
 }
]
 }
}
```

sort

- field: the name of the field used to sort the response.

filter

- direction: the sort order. It can be asc, ascending, or desc, descending.

Filter consists for an operator, value, and field. Filters are operands when used in conjunction with a boolean operator, such as and.

- operands: filters are used as operands when combined in a filter by using a boolean operator. There are two available boolean operators:
  - or: one of the conditions must be met.
  - and: all of the conditions must be met.
- operator: there are 11 operators NONE, lt, le, eq, ne, ge, gt, substring, and, or, not. And and or are used to evaluate multiple filters together. The other operators are used to evaluate values within individual filters. Not all operators work with all fields.
- field: the name of the field used in the filter.
- value: the value of the field to be evaluated.

## Migration list results filter example

This example filter is based on the Migration API fields and parameters. This filter searches for migrations that contain a specific string in the name and was started, updatedOn, between two dates.

This filter searches for migrations that contain "doc" in the name and were started between April 8, 2020 at midnight and April 13, 2020 at midnight.

```
{
 "filter": {
 "operator": "and",
 "operands": [
 {
 "operator": "gt",
 "field": "updatedOn",
 "value": "2020-04-08T00:00:00.001Z"
 },
 {
 "operator": "substring",
 "field": "name",
 "value": "doc"
 },
 {
 "operator": "lt",
 "field": "updatedOn",
 "value": "2020-04-13T00:00:00.001Z"
 }
]
 }
}
```

}

filter

Filter consists for an operator, value, and field. Filters are operands when used in conjunction with a boolean operator, such as and.

- operands: filters are used as operands when combined in a filter by using a boolean operator. There are two available boolean operators:
  - or: one of the conditions must be met.
  - and: all of the conditions must be met.
- operator: there are 11 operators NONE, lt, le, eq, ne, ge, gt, substring, and, or, not. And and or are used to evaluate multiple filters together. The other operators are used to evaluate values within individual filters. Not all operators work with all fields.
- field: the name of the field used in the filter.
- value: the value of the field to be evaluated.

## API response codes

Review the HTTP status codes of responses for Enterprise A2019 APIs.

| Status code | HTTP name               | Description                                                                                                                           |
|-------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| 200         | OK                      | Success                                                                                                                               |
| 202         | Accepted                | Indicates that the request has been accepted for processing, but the processing has not been completed.                               |
| 204         | No content              | Success, an API returned no content.                                                                                                  |
| 400         | Bad request             | Request URL or request parameters are incorrect.                                                                                      |
| 401         | Authentication required | Provide authentication details.                                                                                                       |
| 403         | Unauthorized access     | The operation is not authorized.                                                                                                      |
| 404         | Not found               | Control Room server did not find the requested URL.                                                                                   |
| 409         | Conflict                | The request could not be completed because the code conflicts with the current state of the resource, for example, a duplicate entry. |
| 500         | Internal server error   | Indicates that the server encountered a problem. Clear the cookies and cache, and then reload the page.                               |

# Analyze

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Bot Insight is an Automation Anywhere Enterprise analytics platform that provides real-time, interactive, and smart insights about business processes and operational intelligence. Bot Insight is available with out-of-the-box dashboards that you can start using instantly. These dashboards provide analyses to measure the performance of your digital workforce and predict and solve preventable business problems.

## Business analytics through Bot Insight

Automation Anywhere Bot Insight processes real-time and interactive insights about business processes, and provides operational intelligence. Access the bots, and manage and instrument them to gather business analytics and insights, and publish dashboards.

1. [Create and edit bots](#)

The cloud-based bot editor provides tools, packages, and actions to create bots to automate processes.

2. [Instrument the bot for analytics](#)

Business analytics provides information about the transactional analytics for the data that is logged by the variables that are tagged in a task. The information provided can be about the total sales in a month, invoicing and payment trends, insight about new customers, and quote-to-order ratio.

3. [Access Bot Insight](#)

Access Bot Insight to perform the business analytics.

4. [Customize dashboards and widgets](#)

Dashboards represent the RPA infrastructure in the form of meaningful visuals and charts, so that you can analyze, interpret, and take action on the updates that are important to you. The dashboards display dynamically updated information of active users, registered clients, failed tasks, apps, bots, bot schedules, workflows, queues, and the overall status of devices.

5. [Publish a business analytics dashboard](#)

Publish a dashboard to display the production data generated by the task. The analytics consumers who primarily analyze and interpret data can access the published dashboard.

To learn more, search for the Managing RPA Reports Using Enterprise A2019 course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

Related concepts

[Bot Insight dashboards](#) on page 1318

The Bot Insight dashboards provide dedicated graphical insight to help you view your bot information.

Related tasks

[Run your first bot](#) on page 419

Run a bot from the same device that you used to create the bot.

Related reference

[Analyze package](#) on page 532



Use the actions in the Analyze package to specify the actions and variables to use in the Bot Insight dashboard and widgets. The Analyze package enables you to perform transactional analytics for the data that is logged by the variables when the bot runs.

## Accessing Bot Insight

This section provides information about how to access Bot Insight.

To use Bot Insight, the Enterprise Control Room must have the Bot Insight license applied, and you must be logged in as a user with one of the following roles:

1. AAE\_Bot Insight Expert
2. AAE\_Bot Insight Consumer
3. AAE\_Bot Insight Admin

## Access Bot Insight from the Enterprise Control Room

Access Bot Insight to interactively analyze bot data and enhance bot widgets.

Access Bot Insight from the Enterprise Control Room in one of the following ways:

- From the Enterprise Control Room, select Dashboard.
  - a) Locate the Insights tab.
  - b) In the Insights tab, click Explore Bot Insight.  
The Bot Insight window appears.
- From the Bots menu, click My Bots:
  - a) In the My Bots window, click PUBLIC to view the public bots that can be viewed, run, and checked out by other people, based on the permissions set by the administrator.
  - b) Click PRIVATE to view your bots and files.



Note: Private bots and files cannot be viewed by other users. If a bot or file is checked out from the PUBLIC tab, it can be viewed and run by other users. However, the bots and files cannot be edited by other users.

- c) Select your bot from the Files and Folders menu.  
Alternatively, enter the search parameters in the Search Name field and search for your bot.
- d) Open the bot and click Analyze.  
The Bot Insight window appears.

## Roles to access Bot Insight

The Enterprise Control Room restricts Bot Insight access to users with certain roles.

Access to the dashboard depends on the user roles assigned to a user and the access permission granted to those user roles. See [Role-Based Access Control](#).

Apart from the Bot Creators, users with the following user roles have access to business analytics dashboards:

#### Bot Insight Admin

Use this role to perform the following operations in Bot Insight:

- View the Data Profile of the task data for which the dashboard report is generated.
- Analyze and save the system-generated dashboards.
- Analyze, save, publish, and delete the user-generated dashboards.
- Bookmark, compare, and share the dashboards.

#### Bot Insight Expert

Use this role to perform the following operations in Bot Insight:

- Analyze the data in the dashboards that are deployed in the production environment.
- Save the system-generated dashboards.
- Analyze, save, publish, and delete the user-generated dashboards.
- Bookmark, compare, and share the dashboards.

#### Bot Insight Consumer

Use this role to perform the following operations in Bot Insight:

- Analyze the data in the dashboards that are deployed in the production environment.
- Bookmark, compare, and share the dashboards.

## Role-based access control in Bot Insight

Role-based access control (RBAC) enables an Enterprise Control Room administrator to restrict access to the various components of Bot Insight.

The Enterprise Control Room administrator can grant access to various user roles based on your requirements. When adding a user, you assign appropriate roles to that user. A user will have access to the components and folders based on the roles assigned to them.

### RBAC for business analytics

Dashboards for business analytics are available for the tasks that are enabled for analytics. The Enterprise Control Room administrator and users who have access to a task can view the dashboards for those tasks. You can access the dashboard for a task from the Insight tab in the DASHBOARD section of the Enterprise Control Room and from the ANALYZE tab in the Workbench.

To view the Bot Insight dashboards, you must be granted access to the folder containing the corresponding tasks.

For example, you have created various tasks related to sales and accounting and stored them in the Sales and Accounts folder. If you want to grant access to the sales-related tasks to members of your sales department, you need to provide them access to the Sales folder. The same applies to grant access to the accounts-related tasks in the Accounts folder.

The following table illustrates the access the various members of the Sales and Accounts team will have:

|                               | Sales_Dep |      |      | Accounts_Team |         |
|-------------------------------|-----------|------|------|---------------|---------|
|                               | John      | Mark | Dave | Smith         | Micheal |
| Access to the Sales folder    | Yes       | Yes  | Yes  | No            | No      |
| Sales1                        | Yes       | Yes  | Yes  | No            | No      |
| Sales2                        | Yes       | Yes  | Yes  | No            | No      |
| Access to the Accounts folder | No        | No   | No   | Yes           | Yes     |
| Accounts1                     | No        | No   | No   | Yes           | Yes     |
| Accounts2                     | No        | No   | No   | Yes           | Yes     |
| Accounts3                     | No        | No   | No   | Yes           | Yes     |

## Bot Insight dashboards

The Bot Insight dashboards provide dedicated graphical insight to help you view your bot information.

Dashboards represent the RPA infrastructure in the form of meaningful visuals and charts so that you can analyze, interpret, and take action on the updates that are important to you. You can use dynamically updated information about active users, failed tasks, apps, bots, bot schedules, workflows, queues, and the overall status of devices to create custom dashboards and widgets.

When you create and run a bot, Bot Insight automatically creates a default dashboard. If you have a parent bot and a child bot, Bot Insight creates a separate dashboard for each of the bots.

When you deploy and run a bot on the Bot Runner machine, Bot Insight aggregates all the information related to that bot. The published dashboard for that bot displays the aggregated bot information.

My dashboards displays the following dashboards:

- [Operations dashboard](#) on page 1320
- [Business dashboard](#) on page 1322



Note: You must have either the AAE\_Bot Insight Admin or the AAE\_Bot Insight Consumer role assigned to you to view the published dashboard.

## Viewing Bot Insight dashboards

The Bot Insight dashboards provide customizable widgets for you to gain insights in specific scenarios. You can view information about your bots on the Bot Insight dashboards from the Enterprise Control Room.

When you tag variables for analytics in a task and then run the task, Bot Insight generates the analytics dashboard. By default, the system-generated dashboard has the same name as that of the task. You can customize this dashboard to your requirements.

Business analytics provide information on the transactional analytics for data that is logged by the variable tagged in a task. The information provided can be about total sales in a month, invoice, payment trends, new customer insights, or quote-to-order ratio. You can select your dashboard from the Select a Dashboard drop-down menu to view the analytics.

Bot Insight provides the following dashboards:

- Configure

The system-generated dashboards are available in the Configure tab in the Bot Insight window.

- Analyze

The customized dashboards can be published and are available in the Analyze tab in the Bot Insight window.

- Operation

The Operation dashboard provides information about bots that are created, deployed, or scheduled to run across different Bot Runner machines. You can use the information to enhance productivity and take measures based on real-time information for RPA deployments.

1. Log in to the Enterprise Control Room with one of the following roles:

- AAE\_Bot Insight Admin
- AAE\_Bot Insight Expert
- AAE\_Bot Insight Consumer

2. Click Explore Bot Insight from the Insights tab.

The Bot Insight dashboard appears in a new window.

## Viewing Insights

You can view information about business data in Bot Insight.

Click Insights from the Analyze tab to view information about interesting facts on business data.

The Insight dashboard provides information about business data that is logged through Bot Insight without the need to analyze the dashboards. It provides a snapshot of data that you can use to enhance your bot productivity. This feature highlights important facts that are inferred from within the business process data logged by the bots.

A bot created to process orders displays the following information:

- Total processing cost
- Process time
- Monthly payment
- Total payment

The dashboard provides information about the difference between the calculated metric values for a specific time interval:

- Yesterday
- Last 7 days
- Last 30 days

The Insight dashboard enables you to configure the variance thresholds for indicating metric-level health.

Perform the following steps to configure the variance thresholds:

1. Click Settings.

2. In the Variance Threshold window, move the slider to the left or the right to adjust the variance threshold.
  - Move the slider to the left for a Poor metric health level.  
The poor metric level health is represented in red.
  - Move the slider to the right for a Good metric health level.  
The good metric level health is represented in green.
3. Enter the values in the Fair field to set the Fair metric health level.
4. Select the Switch poor and good check box to switch between the Poor and Good metric health levels.
5. Click Save.

## Operations dashboard

The Bot Insight Operations dashboard provides information about bots that are deployed on different Bot Runner machines and bot statistics based on performance. You can use this information to enhance productivity and take measures based on real-time information for RPA deployments.

The Operations dashboard provides visual insight into various operational aspects of bots and displays hyperlinks to the following dashboards:

- Bots Dashboard
- Audit Dashboard
- Device dashboard

These dashboards appear as the Default dashboards and are automatically created by Bot Insight based on the variables that are used in the bot. You can use the Save As function to save the Default dashboard as a Custom dashboard. You can also add widgets from the Visualizations menu to your custom dashboards.

[Using widgets](#) on page 1332

## Bots Dashboard

You can view information about the bots that are created, deployed, scheduled, and running across various Bot Runner machines.

The dashboard displays the following bot information:

- Total Bot Runs: Displays the number of running bots.
- Total Completed (Success): Displays the number of bots that have ran successfully.
- Total In Progress: Displays the number of in-progress bots.
- Total Failed: Displays the number of bots that had failed to deploy or run.
- Weekly Bot Status: Displays the weekly status of bots that are scheduled to run.



Tip: You can hover over the widget to view the number of bots that have run successfully, failed to deploy, and failed to run. It also displays the weekly bots statistics percentage.

- Failure Reasons: Displays reasoning information on bots that had failed.



Note: The Error Message field displays a snapshot of the original error message and extensive details on why the bot failed. You can export the error messages and logs to a CSV file, which you can later use to troubleshoot.

## Audit Dashboard

This dashboard displays various widgets that provide information about Enterprise Control Room events. Users with the `View everyone's audit log actions` permission have access to view the audit information captured in the Enterprise Control Room.

[System roles](#) on page 1122.

The dashboard displays the following information:

- Event Distribution by Activity Type
- Event Distribution by User Name
- Event Distribution by Source
- Event Distribution by Control Room Source
- Event Distribution by Workbench Source

You can perform the following actions in the Operations dashboard:

- Enter the name of the dashboard in the Search text box to access a dashboard.
- Click the Favorite tab to bookmark your dashboard.
- Double-click the Favorite menu to remove bookmarks.

You can view information in the following tabs:

- Total Views: Displays the number of users who viewed a particular dashboard.
- Last Refreshed: Displays the time and date of when a particular dashboard was last refreshed.

You can click the arrow next to the Operations dashboard tabs to organize the dashboards to your requirements.

You can customize the widgets in the Operations dashboard. You can perform the following functions:

- [Working with Bot Insight dashboards](#) on page 1327
- [Comparing dashboards](#) on page 1327
- [Sharing a dashboard](#) on page 1330
- [Taking a screenshot of a dashboard](#) on page 1330
- [Downloading a PDF file from a dashboard](#) on page 1330

## Device Dashboard

The Device dashboard displays various widgets that provide information about resource utilization of the machines on which bots are executed.

The dashboard provides key metrics to analyze the status and utilization of devices. It also displays the activity history of the bots that are deployed on the machines.

The dashboard displays the following information:

- Online Devices: Displays the number of Bot Runner machines that are active or online at a point in time.
- Offline Devices: Displays the number of Bot Runner machines that are inactive or offline at a point in time. Devices can be online even though no bots are deployed on them.
- Bot Schedules on Devices: Displays the number of bots that are scheduled to run on all the Bot Runner machines.
- Device Utilization%: Provides the overall time used by bots that are executed across all the Bot Runner machines. You can view and analyze the utilization information by date using the following criteria:

- Bot duration
- Unit: %
- Group 1: Start date time of a bot (interval: day)
- Group 2: device name

There is no limit on the number of devices that can be displayed on the dashboard.

- Device Activity History: Provides information about the execution history of bots deployed on each Bot Runner machine. The Device Activity History table provides the following information:
  - Device name
  - Bot name
  - Bot duration (milliseconds)
  - Start date time of a bot
  - End date time of a bot
  - Status

When the Group1 and Group 2 fields have date type variables and you select Bot Duration as a metric, the Percentage (%) option appears as an additional option for Bot Duration Unit. Based on the selected group interval, the percentage is calculated for the bot duration.

Example: When you select the parameters in the following fields as:

- Group By or Sub By: Date
- Interval: Year
- Metric: Bot Duration
- Bot Duration Unit: Percentage (%)
- The percentage calculated for bot duration is:  

$$(10000/1000ms * 60s * 60m * 24h * 365days) * 100 = \%$$



Note: The percentage calculation of the bot duration is available in all the widgets, except datatable and maps.

- Top Error Messages: Provides information about the error messages for any bot failure and the frequency of occurrence.

## Business dashboard

The Bot Insight Business dashboard provides information about the Bot Insight data and statistics based on bot performance. You can use this information to enhance your productivity and take measures based on real-time information for RPA deployments.

The Business dashboard provides visual insight into the various business aspects of the bots. From this dashboard, you can access both the Default and Custom dashboards.

Bot Insight automatically creates the Default dashboard based on the variables that are used in the bot. You can use the Save As function to save the Default dashboard as a Custom dashboard. You can also add widgets from the Visualizations menu to your custom dashboards.

[Using widgets](#) on page 1332

In the Custom dashboard, Bot Insight enables you to export data from a dashboard widget to CSV files.

[Exporting data from a dashboard widget](#) on page 1337

You can perform the following actions in the Business dashboard:

- Enter the name of the dashboard in the Search text box to access a dashboard.

- Click the Favorite tab to bookmark your dashboard.
- Double-click the Favorite menu to remove bookmarks.

The dashboard displays the following bot information:

- Bot Name: Displays the name of bots that are associated with the business dashboards.
- Total Views: Displays the number of users who viewed a dashboard.
- Last Refreshed: Displays the time and date on which a particular dashboard was last refreshed.
- Modified By: Displays the name of the user who had last modified the dashboard.

You can click the arrow next to the Business dashboard tabs to organize the dashboards to your requirements.

In the Dashboard Name tab, select the dashboard that you want to access to view the dashboard. You can also enter the name of the dashboard in the Search text box to access the dashboard directly.

Click Rank in the Distinct Count row to view the rank of each variable. You can view the string data type values that are logged by a variable for the maximum or minimum number of times. This further enhances your ability to verify that the data is logged correctly in the bot.

[Viewing ranks of string datatype values](#) on page 1328

The Business dashboard widgets displays the following information:

- The total number of variables
- The comparison between number variables and transaction status
- The comparison between number variable distribution and transaction status
- A bar chart representing the distribution between the number variables and string variables
- A pie chart representing the relationship between variables in numbers and strings

The Profile dashboard displays bot variables and the transaction data. The Task Name table displays the variable name, display name, data type, inclusion details, maximum, minimum, average, sum, distinct count for the date, string, and number variables.

The Transaction Data table displays the variable name, display name, data type, inclusion details, minimum, maximum, average, sum, and distinct count metrics for the following parameters:

- Machine Name
- Transaction Name
- Transaction Start Time
- Transaction End Time
- Total Transaction Duration (Start Time - End Time)
- Transaction Status (In Progress or Completed)
- User Name (User who runs the bot)

You can use the Preview Data option to view the total number of records maintained for each variable. When you create and run a bot with multiple Transaction Blocks with Analyze, Open, or Close commands, all the tagged business variables are displayed in the Transaction Names menu.

You can customize the widgets in the Business dashboard. You can perform the following functions:

- [Working with Bot Insight dashboards](#) on page 1327
- [Comparing dashboards](#) on page 1327
- [Sharing a dashboard](#) on page 1330
- [Taking a screenshot of a dashboard](#) on page 1330
- [Downloading a PDF file from a dashboard](#) on page 1330



## AARI dashboard

Use the AARI dashboard in Bot Insight to view various widgets that provide information about requests created from published processes in Automation Anywhere Robotic Interface (AARI).

### Overview

The dashboard provides statistics and shows information about created requests for each process, which can vary from a simple summary to a complex cross-departmental view. You can use this real-time information to make process-related operational decisions. For example, consider a scenario where a manager can get a high-level activity overview of completed and pending tasks in the payroll process, which can then help the manager take necessary actions about the process.

From the AARI dashboard, you can access both the Default and Custom dashboards. Bot Insight automatically creates the Default dashboard from the variables used in the process. You can use save the Default dashboard as a Custom dashboard if required. You can also add widgets from the visualizations menu to your custom dashboards.

Based on RBAC, the following users have access to view the data on the dashboard:

- `AAE_Robotic_Interface_Admin` can view all data inside AARI on the web interface across all teams.
- `AAE_Robotic_Interface_Manager` can view all data inside AARI on the web interface for their own teams.

### What you can view in AARI dashboard

The dashboard helps you to visualize and track the number of requests that are open, completed, canceled, or failed.

The dashboard also provides the following capabilities:

- **Heat map chart:** Visualize data about the percentage of request created for each process for a day. You can specify the dates by function (day) to get specific information using the following criteria:
  - Group1: created date (interval: day)
  - Group 2: process name
  - Metric: request created in percentage (%) for each process
- **Request activity history:** This table provides the execution history of the processes deployed on each Bot Runner machine. It includes information such as the following:
  - Process name
  - Username
  - Request details such as the status, ID, end time and start time, duration
  - Total human and bot duration
  - Total human and bot tasks
- **Stacked bar chart:** Analyze the average duration taken by each process for human and bot tasks. For example, consider that there are two processes named API Test-Form 1 and API Test-Form 2 in the bot task type. For each process, the chart shows the average time (in seconds) taken for its execution. You can view and analyze this information using the following criteria:
  - Group 1: task type (human and bot)
  - Group 2: process name
  - Metric: duration (average)

## Editing a data profile

You can modify the data profile of both the Default and Custom Business dashboards without modifying the bots.

You can edit the data profile and regenerate the dashboard based on the new data profile. You can edit the display name of a variable, change its data type, and exclude it from the dashboard.

Bot Insight provides smart data profiling for information about countries, states, and zip or postal codes. Bot Insight analyzes the information provided in the variables and automatically identifies the information as:

- Country (country code or country name)
- State (state code or state name)
- Zip code (five-digit zip code)

You can edit the data profile to convert the above parameters from numeric format to string format (country and state) based on your requirements. You can convert the zip code to either string or numeric format, and use the information to create widgets (world and US map widgets) in the Bot Insight dashboard.

1. Open the Bot Insight dashboard.
2. Click Profile.

The Profile window appears, displaying all the variables that you have tagged during the bot creation.

3. Click EDIT.
4. Specify a new name for a variable in the Display Name field.
5. Select an option from the Datatype drop-down list to specify a new data type for a variable.

You can change the datatype of a numeric variable to string, string to country, state, and zip code.



Note: Changes to the Data Type parameter cannot be reverted.

6. Clear the Inclusion check box to exclude the variable from the dashboard. Select Inclusion to include a variable from the dashboard and configure how the initial SMART dashboard is generated. You can view the minimum, maximum, average, sum, and last value for the numeric values, but not for the string and timestamp variable types.
7. Click Save and Generate Dashboard to save the changes and generate the dashboard with the updated value.

## Bot Insight dashboard filter

The Bot Insight dashboard filter enables you to apply filters across your dashboards to display the filtered data. You can save and publish the custom dashboards with preset filters.

Filters in the Bot Insight dashboard enables you to choose different views of the data. You can apply and save filters in a dashboard to preserve the filtered view. The filtered view displays the same view the next time you view the dashboard.

Dashboard filters enables different combinations of data in a single dashboard. The filter eliminates the need for separate dashboards for different users. A single-filtered dashboard allows you to serve data requirements for a wide range of users.

You can access the dashboard filter from both the Operations and Business dashboards. You can click each item in the filter list to view the parameters. You can search for a specific parameter in the Search Automation Name field in the All tab. You can select parameters based on whether to include or exclude them in the filter. The selected parameters appear in the Selected tab.

When you apply a specific filter, the visual indicator in the dashboard displays the name of the applied active filter. You can delete a dashboard filter by clicking the delete icon. When you publish a custom dashboard with the applied the dashboard-level filters, the published dashboard contains the same filters. You can click Widgets in the widget window to apply dashboard widgets.

The Bot Insight dashboard provides the following filters:

- **Attributes:** This filter enables you to include or exclude specific parameters of a given attribute. This can be the bot name, device name, or user name.
- **Numeric:** This filter enables you to select a specific duration for which you can get the numerical statistics of the bot. This can be the total number of lines that is processed by the bot, or the duration during which the bot was active.
- **Time:** This filter enables you to select a single date, or a range of dates to analyze the variables that are categorized under time and date. This can be the bot start time or end time.

Related concepts

[Operations dashboard](#) on page 1320

The Bot Insight Operations dashboard provides information about bots that are deployed on different Bot Runner machines and bot statistics based on performance. You can use this information to enhance productivity and take measures based on real-time information for RPA deployments.

## Adding a dashboard filter

To create a dashboard filter, select a field containing the information type you want to filter and define the return of the data. The filtered view is preserved so that the same view is displayed the next time you view the dashboard.

1. Open the dashboard to which you want to add a filter.
2. Select the parameter based on your requirements in the Attributes tab, .

The parameter window appears.

- a) Enter the name of the variable in the Search field.

The variable appears in the All tab. Select the variable that you want to add in the filter. The selected variable appears in the Selected tab.

- b) Choose one of the following options:

- Click Include to include the variable in the dashboard filter.
- Click Exclude to exclude the variable in the dashboard filter.

- c) Click Apply.

The Attributes filter is added to the dashboard.

3. Select the parameter in the Numeric tab.
4. Perform these steps in the selected parameter window:
  - a) Select the condition that you want to specify in the filter.
  - b) Enter the minimum and the maximum values.
  - c) Click Apply.

The Numeric filter is added to the dashboard.

5. Select the parameter based on your requirement in the Time tab.
6. Perform these steps in the selected parameter window:
  - a) Select a specific date, or a range of dates.
  - b) Click Apply.

The Time filter is added to the dashboard.

Related reference

[Customizing a dashboard](#) on page 1328

Log in to Bot Insight with the `AAE_Bot_Insight_Expert` role to customize the information displayed in the system-generated dashboard to make it more relevant for an analytics consumer.

## Working with Bot Insight dashboards

You can save or delete a Bot Insight dashboard when required. You can also delete a user-created dashboard.

When you delete a dashboard, it does not impact the data associated with that dashboard. You can delete dashboards that are available in the Analyze and Configure tabs of the Bot Insight window. The dashboards available in the Analyze tab are the published dashboards. Therefore, if you delete a dashboard from the Analyze tab, it will no longer be available for other users.

- Save a dashboard:
  - a) Open the dashboard that you want to save.
  - b) From the Actions menu, select Save as.  
The Save Dashboard window appears.
  - c) In the Dashboard Name field, enter the name for the dashboard.
  - d) In the Dashboard Description field, enter the description of the dashboard.
  - e) Click Save.  
Click Save As to save a default dashboard as a customized dashboard.
- Open the dashboard you want to delete.
  - a) Click Delete on the toolbar.
  - b) Click Okay.

## Comparing dashboards

You can compare dashboards that belong to two separate processes, or the same process with different filters. The dashboards selected for comparison appears as a side-by-side view to enable you to obtain better insights.

- Compare dashboards:
  - a) Open the dashboard that you want to compare.
  - b) Navigate to Actions > Compare in the Bots Dashboard.  
Your dashboard is now in compare mode. The dashboard you have opened appears in both the Left View and Right View. You can apply widget filters to your dashboard at any time.
- Apply widgets to your dashboards:
  - a) Click the Filter option from your dashboards, represented by the three dots in the corner.  
The Filter window now appears and shows the available widgets.



Note: The Filter option next to the Close option accesses the same Filter window. You can also expand or minimize the Filter window.

- b) Select the Left View or Right View.
- c) Select the Attributes, Numeric, or Time widgets that you want to apply.
- d) Optional: Click Clear All to reset all your widget selections.
- e) Click Apply to confirm.

You can now compare your dashboard with widgets.

## Customizing a dashboard

Log in to Bot Insight with the `AAE_Bot_Insight_Expert` role to customize the information displayed in the system-generated dashboard to make it more relevant for an analytics consumer.

To make changes in a Bot Insight dashboard, create a copy of the dashboard, and then update the copy.

After you create customized dashboards for a bot, you can make changes to the tagged variables. You can delete and add variables based on your requirements. By default, the standard dashboard always displays the latest data profile. We recommend you use the system-generated standard dashboard, and then create customized dashboards from it. Data profile updates are highlighted with a red dot in the following scenarios:

- When there are data profile updates.
  - The variables that are newly added display the message `NEW`.
  - The variables that are deleted display the message `DELETED`.
- When the customized dashboard data profile does not match that of the standard dashboard.

Related tasks

[Editing a data profile](#) on page 1325

You can modify the data profile of both the Default and Custom Business dashboards without modifying the bots.

## Viewing ranks of string datatype values

You can view the string datatype values that are logged by a variable for the maximum or minimum number of times. This enhances your ability to verify that the data is logged correctly in the bot.

1. Open the dashboard for which you want to edit the data profile.
2. Click the Profile tab.
3. Click Rank within the Distinct Count column.

The Distinct Count column displays the number of unique values logged by a variable.



Note: The Rank option is only available for the variables that log values of string datatype. A message appears displaying the top five values that are logged for the maximum number of times in the variable.

4. Select Bottom from the list to display the top five values that are logged for the least number of times in the variable.
5. Select an option from the list to display five or ten values in the message box.

## Previewing data

You can view all the variable data associated with a task using the Preview Data option.

1. Open the dashboard for which you want to preview the data.

2. Click the Data Profile tab.
3. Click the Preview data option.  
A new window appears displaying all the variable data associated with that task.

## Verifying data populated in a custom dashboard

After you create a custom dashboard that contains new widgets or customized widgets from the system-generated dashboards, you can verify the data that is populated in the dashboard.

1. Open the task for which you want to verify the data in Bot Insight.
2. Click Run on the toolbar.
3. Click the ANALYZE tab.  
The system-generated dashboard for the task appears.
4. Click the Analyze tab in the Bot Insight window and search for the customized dashboard for which you want to verify the data.
5. Select the dashboard from the search results.  
The dashboard appears.
6. Click the Data Profile tab and verify the data for the dashboard.

## Publishing a business analytics dashboard

Bot Insight enables you to publish a business analytics dashboard that is generated for a task. You can publish both the Custom and Default Business dashboards.

Before you publish a dashboard, ensure that the particular bot resides in the Public folder in the Enterprise Control Room.

1. Open the dashboard that you want to publish.
2. Customize the dashboard based on your requirements and verify the content and presentation formats.
3. Click Publish on the toolbar.
4. Specify a name for the dashboard, and then click Okay.  
The dashboard is now published and available to display the production data generated by the task. The dashboard updates the data each time a task runs in the production environment from the Enterprise Control Room on a regular basis.  
In the Enterprise Control Room, ensure that you deploy the bot in the Bot Runner device so that the published dashboards are populated with data.

### Related tasks

[Import bots](#) on page 1163

You can import bots with their dependencies from one Enterprise Control Room to another. The source environment can be either an Enterprise A2019 Control Room or a 11.x Control Room instance.

## Reviewing data in a published dashboard

You can review the data available in a published dashboard.

1. Open the Bot Insight window.
2. Search for the dashboard for which you want to view the data.
3. Select the dashboard from the search results.  
The selected dashboard appears.
4. Review the data available in the dashboard.  
The dashboard reflects the data processed by the task in the production environment.

5. Export the entire dashboard in PDF or PNG format for offline consumption and review.

## Sharing a dashboard

You can share the link to view a dashboard through email using the Share via email option.

1. Open the dashboard that you want to share.
2. Click Share via email on the toolbar.  
The email client configured on your system appears. The email client contains a link to access the dashboard.
3. Specify the email address of the recipients and send the email.

## Downloading a PDF file from a dashboard

You can download the data available in the dashboard as a PDF file.

1. Open the Bot Insight window.
2. Search for the specific dashboard.
3. Select the dashboard from the search results.  
The selected dashboard appears.
4. Review the data available in the dashboard.
5. In the Actions menu, click Download PDF.
6. In the Download PDF window, navigate to the location on your local disk drive.
7. Click Save.

## Taking a screenshot of a dashboard

You can take a screenshot of the data available in the dashboard.

1. Open the Bot Insight window.
2. Search for the dashboard for which you want to view the data.
3. Select the dashboard from the search results.  
The selected dashboard appears.
4. Review the data available in the dashboard.
5. In the Actions menu, click Screenshot.
6. In the Download PDF window, navigate to your local disk drive location.
7. Click Save.

# Using Bot Insight

Use Automation Anywhere Bot Insight to track bot data for analytics.

Automation Anywhere bots are built, run, and monitored in the Enterprise Control Room. Bot Insight accesses real-time business insights and digital workforce performance data to leverage content-level productivity data from the bots that are deployed. Data is logged for business analytics who has Attended and Unattended Bot Runner license .

Log in to Automation Anywhere Enterprise Control Room as an `AAE_Bot Insight Expert` or `AAE_Bot Insight Consumer` to interactively analyze bot data and enhance bot widgets.

In the Enterprise Control Room, select the Bot Insight tab, to do the following tasks:

- Interactively analyze the bot data in the dashboards.

- Refine and enhance widgets in the Bot Insight dashboards before they are published for wider consumption and deployed to production.

## Business analytics

Business analytics provide information about the transactional analytics for the data that is logged by the variable tagged in a task. The information provided can be about the total sales in a month, invoicing and payment trends, insight about new customers, or quote to order ratio.

When you tag variables for analytics in a task, and run the task, Bot Insight generates the analytics dashboard. By default, the generated dashboard has the same name as that of the task. You can customize the system generated dashboards based on your requirement.

## Configuring a task for business analytics

To configure a business analytics automation task, enable analytics (using the Analyze: Open and Analyze: Close actions) and tag the variables that are of interest for data analysis.

To configure a task for business analytics in an existing bot:

1. Log in to the Enterprise Control Room.




---

Note: Ensure that you have the Bot Creator license assigned to you.

---

2. In the My Bots pane, select the folder that contains the task for which you want to enable analytics. The Actions palette appears in the left-hand side. See [Actions palette content for bot creation](#) on page 518.
3. Build a bot.  
For more information about building and editing a bot, see [Get started building bots](#) on page 885.
4. Insert the Analyze: Open action at the beginning of the transaction.
5. Insert the Analyze: Close action at the end of the transaction.  
The Analyze: Close menu lists all the variables in the transaction. Select the variables that are tagged in the transaction to process business analytics.



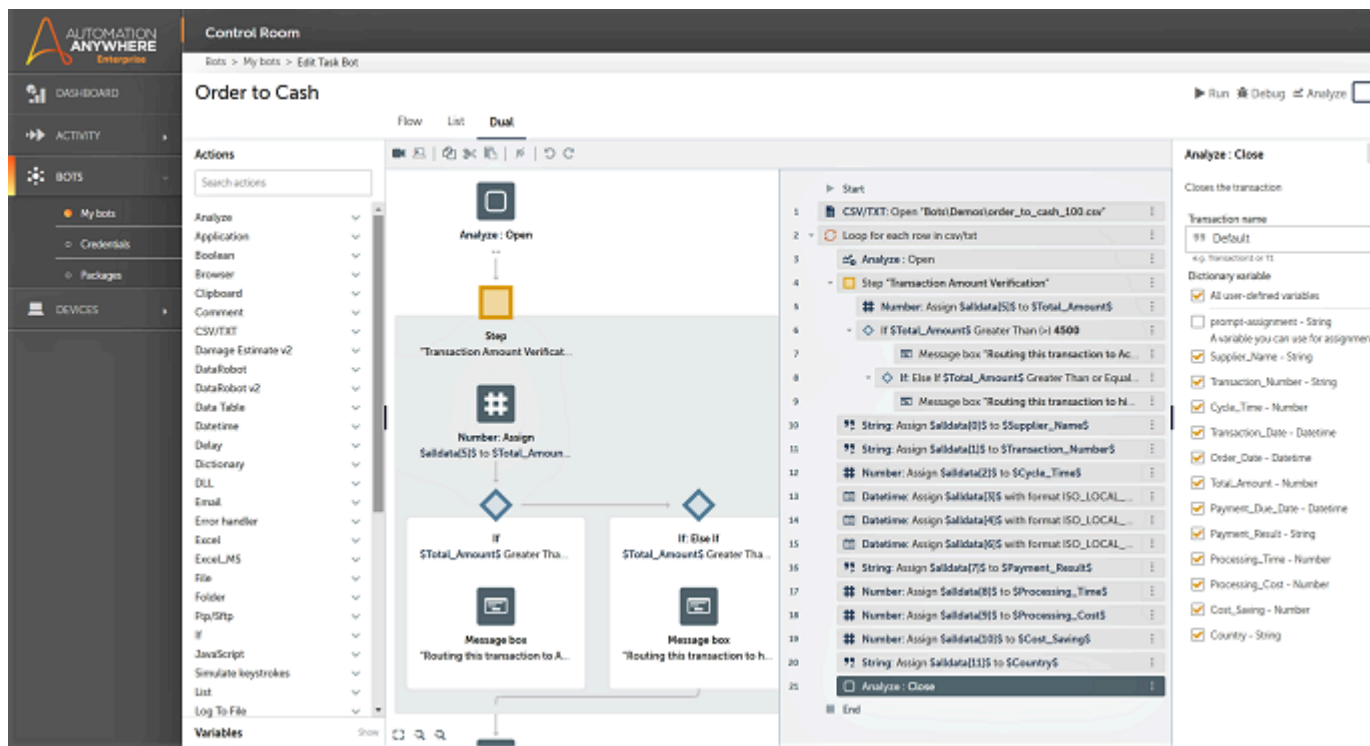

---

Note: This feature enables you to deselect variables that might raise potential privacy concerns, such as social security numbers or bank account details.

---

6. Click Apply.  
Click Reset to reset the variable selection.
7. Click Save.
8. Click Run.  
The Bot Run Successfully message appears.





9. Click Analyze.  
The Bot Insight window appears.
10. Select a bot from the Select a Dashboard drop-down list.  
Click the arrow to view the list of bots.

## Using widgets

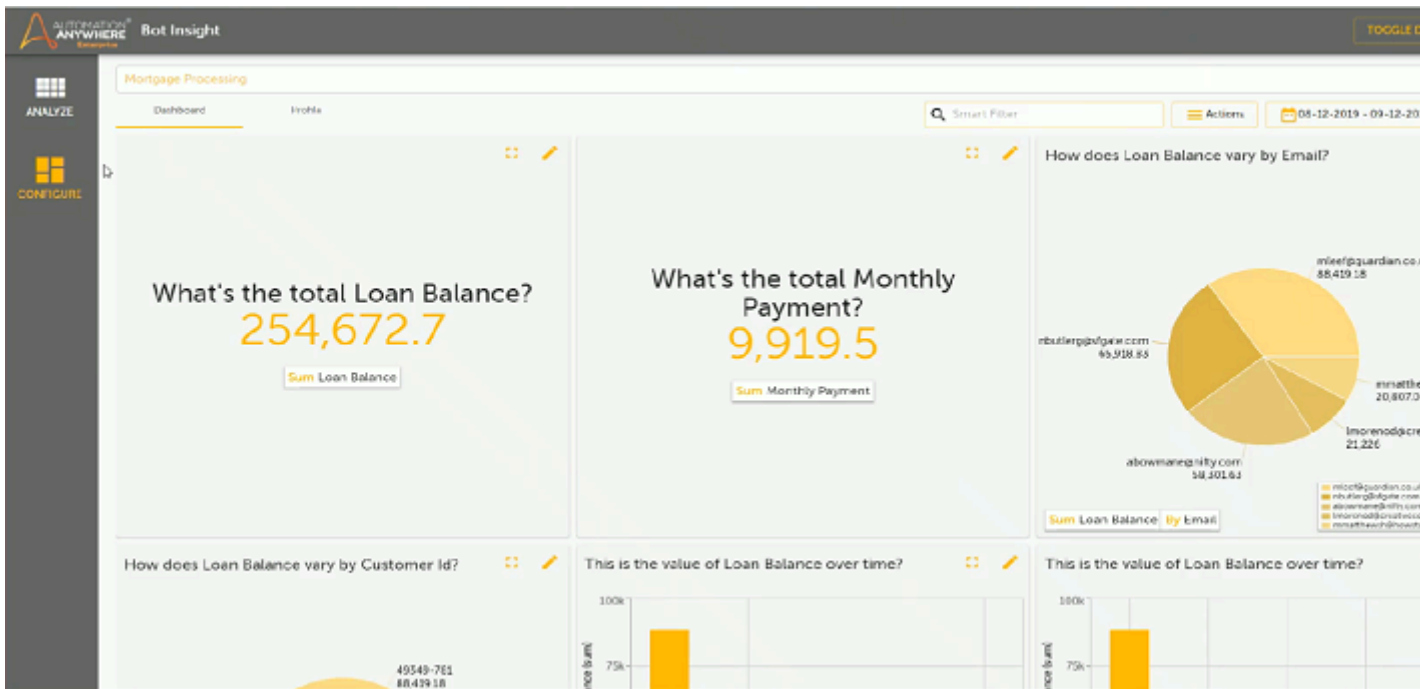
The Bot Insight dashboard provides a host of highly customizable widgets that you can use to gain insights for specific scenarios.

When you select a particular bot, the default widgets automatically appear in the Dashboard window. You can select the widgets and reposition them in the dashboard. To search for specific information, use the Smart Filter function. You can enter the search parameters in the Smart Filter field.

You can also use multiple filters to search for data the widgets should display. Enter the filters, search parameters, separated by a comma in the Smart Filter field. You can create, move, rename, and edit the widget properties in a dashboard, based on your requirements.

The available options are:

- Chart filters
- Chart style
- Metric-based filters
- Comparison metrics



You can group information by dates and use the Date Interval to view when a particular bot was active.

The following Date type options are available:

- Hour
- Day
- Week
- Month

## Adding a dashboard widget

You can add custom widgets to the Bot Insight dashboard based on your requirements.

1. Open the dashboard.
- 2.



Click the icon.

The Add Visualization window appears.

3. Select a widget that you want to add in the dashboard. See [Bot Insight visualizations](#) on page 1334. The Selected Chart window appears.
4. Optional: Click the Switch Widget button to change widgets.
5. Click Next. The Construct Your Query window appears.
6. Enter the query information to construct your dashboard. For reference to create a widget query, see [Configuring a Line Bar Chart query](#) on page 1335.
7. Click Next. The Ready to build window appears.
8. Click Confirm. The widget appears in the dashboard.

## Bot Insight visualizations

The Bot Insight dashboards provide customizable widgets that you can use to gain insights for specific scenarios.

Bot Insight offers the following visualization widgets:

- Gauge Chart
- KPI
- Vertical Bar Chart
- Line Bar Chart
- Clustered Line Bar Chart
- Horizontal Bar Chart
- Vertical Stacked Bar Chart
- Horizontal Stacked Bar Chart
- Vertical Clustered Bar Chart
- Horizontal Clustered Bar Chart
- Heat Map
- Pie Chart
- Donut Chart
- Line Chart
- Scatter Chart
- Bubble Chart
- Datatable Chart
- World Map
- US Map

The Heat Map widget enables you to visualize data as a heat map chart. You can specify the dates by function (day, week, month, or year) to drill down to specific information. This map displays all the possible available combinations of variable values in the X and Y axes. Blank heat map blocks appear if there the value attached to the variable is 0. The color of the heat map block depends on the value of the information displayed. A new window with all the relevant information appears when you hover your mouse over a particular heat map block.

The Datatable Chart widget enables you to view and analyze information about all the logged data in a tabular chart. You can select the attributes and metrics based on your requirement. All the available attributes and metrics are selected by default.

The World Map widget provides information about the data variables and enables you to drill down to specific information:

1. Country
2. State
3. Zip Code
4. Latitude
5. Longitude

The US Map widget provides the following information about the data variables and enables you to drill down to specific information:

1. Country
2. State
3. City

#### 4. Zip Code

The Line Bar Chart and the Clustered Line Bar Chart widgets enable you to view and analyze information about your metrics and attributes. You can input two metrics and one attribute in Line Bar Chart widget, while in the Clustered Line Bar Chart widget, a Sub group option enables you to add one more attributes if necessary.

The widget displays a line bar graph aggregated by group values when only one attribute is selected or a clustered line bar graph aggregated by subgroup values when two attributes are selected. It displays group sectioning which forms multi-axes labels. You can use Date types as interval options, grouped by Day, Week, Month, Quarter, and Year, with the Day set as default.

[Configuring a Line Bar Chart query](#) on page 1335

Related tasks

[Adding a dashboard widget](#) on page 1333

You can add custom widgets to the Bot Insight dashboard based on your requirements.

### Configuring a Line Bar Chart query

You can construct a custom query based on specific parameters to apply to your widget for line bar and clustered line bar charts.

After you are in the Construct Your Query window, follow these steps to select parameters to apply to your widget:

- Construct your query settings.

The query settings vary from widget to widget, but the selection process remains the same.

- Enter the title of your widget in the Chart Title field.
- Select a metric option in the Metric or Select Metrics field.  
For Line Bar Chart and Clustered Line Bar Chart, the Metric field is renamed to Y1 Axis and Y2 Axis.
- Select an aggregated value in the Aggregated By field.  
For Line Bar Chart and Clustered Line Bar Chart, the Aggregated By field is renamed to Y1 Aggregated By and Y2 Aggregated By with the same options.
- Select a value from the Group By or Group 1 field.
- Select a secondary value from the Sub Group By or Group 2 field.



Note: The Sub Group By or Group 2 **field** is not available in the Line Bar Chart. For the Metric, Group By and Sub Group By fields, the first value is shown as the default value.

- Select a date value in the Date Interval field.



Note: This field appears when you select the Date Type variable in the Group By and Sub Group By **fields**.

- Construct your advanced query settings.

You can enable more options to any widgets that support advanced settings.

- Click Advanced Settings.  
The settings display the default values. You can change the value of the fields if required.
- Select a limit value in the Limit or Group Limit field.
- Select a sort value in the Sort By or Group Sort By field.
- Select a sort order value in the Sort Order or Group Sort Order field.

- e) Select a secondary limit value in the Sub Group Limit or Group 2 Limit field.
- f) Select a secondary sort value in the Sub Group Sort By or Group 2 Sort By field.
- g) Select a secondary sort order value in the Sub Group Sort Order or Group 2 Sort Order field.



Note: The Sub Group Limit, Sub Group Sort By and Sub Group Sort Order fields are not available in the Line Bar Chart.

## Editing a dashboard widget

You can edit the dashboard widget properties based on your requirements.

You can resize and save the widgets in the Bot Insight dashboard based on your requirements. When you resize a dashboard widget, other widgets in the dashboard are automatically adjusted to fill in the available layout.



Note: Bot Insight allows you to resize widgets in the standard and the customized dashboards. However, it does not allow you to save the widgets after resizing in the standard dashboard.

1. Open the dashboard widget.
2. Click the Edit button.

The Edit window appears.

The Edit menu offers the following options:

|              |                                                                        |
|--------------|------------------------------------------------------------------------|
| Chart Title  | Renames the chart                                                      |
| Metric       | Changes the units                                                      |
| Aggregate By | Changes the aggregation method                                         |
| Group By     | Changes the parameters based on which the widgets are grouped together |

3. Click the bottom of a widget to change the attribute of the chart displayed within the widget.
4. Click Save As to save the widget.

## Drilling down information in dashboard widget

You can drill down information from a dashboard widget based on your requirement. Select the options available in the drop-down list to view specific information in the dashboard widgets.

To use the drill down function feature in the Bot Insight dashboard widget, do the following:

1. Open the dashboard and select the widget.
2. Right-click to view the Drill Down menu.

Drill Down menu sample for a mortgage analytics processing bot :

- Gender
- Mortgage Type
- Customer ID
- Company Name
- Email
- Loan Due Date

- Loan Origin Date



Note: Bot Insight dynamically generates the Drill Down menu options based on the variables you tag when creating the bot.

## Renaming a dashboard widget

You can rename a dashboard widget based on your requirement. The default name of a dashboard widget is based on the type of information that the widget displays.

To rename a widget in the Bot Insight dashboard, do the following:

1. Open the dashboard for the widget to edit.
2. Rollover and click the Edit button.  
The Edit Chart window appears.
3. In the Chart Title field, enter the name of the widget.
4. Click Next.  
The Ready to build! Click Finish window appears.
5. Click Finish.  
The Widget Updated message appears.

## Exporting data from a dashboard widget

You can export data from the Bot Insight Custom Business dashboard widgets to CSV files based on the requirement.

1. Open the dashboard.
2. Identify the widget.
3. Click the Actions icon.
4. Click Export.  
The CSV file is automatically saved in your local drive as `Chart_name_summary_dd_mm_yyyy`.

## Data connector for Power BI

The data connector for Power BI enables you to establish a secure connection to Power BI, and generate and visualize data analytics. You can connect to the Bot Insight APIs in Power BI and apply specific parameters for each of the APIs.

The connector transforms the Bot Insight API responses to data visualizations in Power BI. The data connector for Power BI enables you to perform the following functions in Power BI:

- Authenticate and connect to the Enterprise Control Room.
- Connect to APIs.
- Generate API responses.
- Transform the API responses to create a data model.
- Create visuals, charts or graphs, to represent the data.
- Create reports.
- Share reports with other users on Power BI.

You can access the following APIs from Power BI:

- `getaudittrialdata`
- `getbotrundata`
- `gettaskvariableprofile`
- `gettasklogdata`



Note: Automation Anywhere Power BI connector is certified and available as part of the Microsoft Power BI Desktop August release. The connector is available in the Other section of the Get Data dialog box in Power BI.

In order to update your Power BI to the latest certified release version and use the connector plug-in, manually deploy the data connector in Power BI. This enables you to retrieve information from the Bot Insight API for data analytics.

Related reference

[Bot Insight API](#) on page 1190

Users with the `AAE_Bot_Insight_Admin` or `AAE_Admin` role can access the Bot Insight API to retrieve business and operations data.

Related information

[Microsoft Power BI](#)

## Deploy Power BI connector

Deploy the data connector in Power BI to retrieve information from the Bot Insight API to enable data analytics.

Navigate to `C:\Program Files\Automation Anywhere\Enterprise\Connectors\PowerBI` and access the `AABotInsightV3.mez` data connector file. The `Automation Anywhere\Enterprise\Connectors\PowerBI` path applies to both Microsoft Windows and Linux.

1. Copy the `AABotInsightV3.mez` data connector file to `C:\Users\<your user>\Documents\PowerBI Desktop\Custom Connectors`.



Note: The default installation path for systems running MacOS or Linux is `Documents\PowerBI Desktop\Custom Connectors`.

2. In the Power BI desktop, navigate to `Options > Security > Data Extensions`, and select `Allow any extension to load without validation or warning`.
3. Restart the Power BI desktop.
4. Access the Power BI data connector.

[Configure Power BI connector](#) on page 1338

## Configure Power BI connector

Configure the data connector in Power BI to retrieve information from the Bot Insight API to enable data analytics.

Ensure that your Automation Anywhere Enterprise user name is registered in the Enterprise Control Room and that you have `Bot_Insight_Admin` or the `Bot_Insight_COE_Admin` role assigned to you.



Note: The Power BI Connector is only supported with Database Authenticated Enterprise Control Room.

1. Log in to the Power BI.
2. Click Get Data.  
The list of all the Power BI certified connectors appears.  
For information about how to access non-certified custom connectors, see [Connector extensibility in Power BI](#).
3. Select Automation Anywhere and click Connect.
4. In the Automation Anywhere - Login window, enter the following information:
  - a) In the Control Room Version drop-down menu, select the version of the Enterprise Control Room.
  - b) In the Control Room Host field, enter the IP address or the host name of the Enterprise Control Room server.
  - c) In the Bot Insight Host field, enter the IP address or host name of the Bot Insight server.
5. Click OK.
6. In the Automation Anywhere Login window, enter your Bot Insight user name and password.
7. Click Connect.  
The Bot Insight APIs are authenticated and the authorization tokens are generated. The Bot Insight APIs are loaded dynamically from Swagger, along with the applicable request parameters.
8. Select the required Bot Insight API from the Navigator menu and enter the information in the respective fields.
9. Click Load.  
The API retrieves specific information from the server.  
For details on how to retrieve information from Bot Insight APIs in Power BI, see [Bot Insight API](#) on page 1190.
10. Click Transform Data to convert the structured JSON response to a visual data model.

Related information

[Transform, shape, and model data in Power BI](#)

[Create reports and dashboards in Power BI](#)

[Collaborate, share, and integrate across products with Power BI](#)

## Example: Retrieve information in Power BI using business information API

The Power BI connector enables you to access the Bot Insight API from Power BI. This example task shows you how to retrieve information from the Bot Insight API and build data visualizations in Power BI.

1. Open Power BI.
2. Open the Navigator window, and log in to the Enterprise Control Room by entering the credentials.
3. In the Display Options menu, select fx Business Information.  
The API window appears.
4. In the botName field, enter the name of the bot, or the task for which you want to visualize the analytical data.  
To enter multiple bot names, separate each name with a comma.  
For example, SalesAPAC,SalesEMEA,SalesUS.



5. In the pageNo field, enter the offset value for the rows or records that you want to retrieve.
  - If page = 0, and limit =1000, then rows 0 -1000 will be retrieved.
  - If page = 1, and limit =1000, then rows 1001 -2000 will be retrieved.
6. Optional: In the fromDate field, enter the date from when you want to retrieve the information.  
Format: yyyy-mm-dd, or yyyy-mm-ddTh:m:s.msZ (2020-02-20T12:45:23.000z)

---

-  Note: If you do not enter a date, the API will return all available data.

---

7. Optional: In the toDate field, enter the date till when you want to retrieve the information.  
Format: yyyy-mm-dd, or yyyy-mm-ddTh:m:s.msZ (2020-03-21T15:45:32.000z)

---

-  Note: If you do not enter a date, the API defaults to the current date.

---

8. In the limit field, enter the number of rows or records you want to retrieve.
9. Click Apply.  
Power BI displays the data visualization.

## Configure Tableau web data connector in Bot Insight

The web data connector in Tableau enables you to establish a secure connection with Automation Anywhere Enterprise and to extract, visualize, and analyze data from Bot Insight.

- Ensure that your Automation Anywhere Enterprise user name is registered in the Enterprise Control Room and that you have Bot Insight Admin or the AAE\_Admin role assigned to you.
- Ensure you have access to the desktop or public version of Tableau software.

The Web data connector in Tableau enables you to perform the following functions in Tableau:

- Authenticate and connect to the Enterprise Control Room.
  - Connect to Bot Insight APIs for business and operational information.
  - Use business and operational information to create a data model.
  - Create charts or graphs to represent the data.
  - Create reports and share them with other users on Tableau.
1. Open Tableau.
  2. Select Web Data connector from the Connect option in Data tab.
  3. In the Web Data Connector window, enter your Automation Anywhere URL in web data connector field: <control room url>/tableau/Login.html
  4. In the Automation Anywhere - Login window, enter the following information:
    - a) In the Control Room Version drop-down menu, select the version of the Enterprise Control Room.
    - b) In the Control Room URL field, enter the URL or the host name of the Enterprise Control Room.
    - c) In User Name and Password field, enter your Bot Insight user name and password.
  5. Click Submit to connect to Bot Insight APIs.
  6. Select either Business Information or Operational Information in the Bot Insight window.  
If you are an AAE\_Admin, you can choose between Audit APIs and Operations APIs.
  7. Click Get Data.  
Bot Insight API retrieves information from the server.

8. Click Update Now to gather all the data from Bot Insight in Tableau.  
You can use the retrieved data from Bot Insight for data visualizations and analysis in Tableau.

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