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# Automation Anywhere Version A2019

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# Automation Anywhere Version A2019

## Explore

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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.

### Resources

For a hands-on training on Enterprise A2019, see the Automation Anywhere University course [Get trained and certified on Enterprise A2019 \(A-People login required\)](#).

### 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
- [Enterprise A2019 Release Notes](#)  
Review the new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known behavior or limitations.

- [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.

- [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 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.

- [Enterprise A2019 FAQ](#)

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

- [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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).

#### Related concepts

[Enterprise A2019 Release Notes](#)

[About Automation Anywhere Enterprise A2019](#)

[Security architecture](#)

#### 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.

- [Enterprise A2019.16 Release Notes](#)

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.

- [Enterprise A2019.15 Release Notes](#)

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 A2019.14 Release Notes](#)

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 A2019.13 Release Notes](#)

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.

- [Enterprise A2019.12 Release Notes](#)

Review the new features, supported packages, changed features, fixed features, and known limitations in the Enterprise A2019.12 (Build 4111) release. After you are on Build 4111, an update to Bot agent 7.0.4789 is also required. IQ Bot A2019 Build 4088 is compatible with Enterprise A2019.12 Build 4111. There are no security fixes in this release.

- [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 A2019.10 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 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).

- [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).

- [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.

- [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).

- [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).

Related reference

[Enterprise A2019 feature comparison matrix](#)

[Enterprise A2019 FAQ](#)

Automation Anywhere Version A2019 - 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).

## 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](#)
- [Discovery Bot](#)
- [IQ Bot A2019](#)
- [Bot Insight](#)
- [Automation Anywhere Robotic Interface \(AARI\)](#)

## Enterprise A2019

Bot agent update: Enterprise A2019.16 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 version to A2019.16.

[Automatically update the Bot agent](#) | [Manually update the Bot agent](#)

### 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](#)

- 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](#)

- 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.

Automation Anywhere Version A2019 - 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).

## New features

- Migrate MetaBots that contain DLLs that use lists, values, arrays, and two-dimensional arrays as input and output.

### [How MetaBots are migrated](#)

- 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](#)

- 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](#)

- 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](#).

## 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 | Database package](#)

## 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.

## 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](#)

## Install Bot agent in bulk using registration key (Service Cloud case ID: 00616591)

### Enterprise A2019

Automation Anywhere Version A2019 - 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).

## New features

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](#)

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](#)

## 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](#)

## 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](#)

## Support for Chinese language for Terminal Emulator (Service Cloud case ID: 00500324)

Automation Anywhere Version A2019 - 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).

New features
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.
<a href="#">Service package</a>
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:
<ul style="list-style-type: none"><li>• Get single cell</li><li>• Get multiple cells</li><li>• Read row</li><li>• Read column</li><li>• Get worksheet as datatable</li><li>• Loop</li></ul>
<a href="#">Cell operations</a>   <a href="#">Row and column operations</a>   <a href="#">Loop package</a>
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.
<a href="#">Cell operations</a>
New condition in the If and Loop packages
Enterprise A2019 and Community Edition

Automation Anywhere Version A2019 - 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).

#### New features

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](#) | [Loop package](#)

#### Capture hidden objects using AI-Sense Recorder

Enterprise A2019

Use AI-Sense Recorder to capture hidden image buttons on the application screen.

[Edit a task recorded using AI-Sense](#)

#### 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](#) | [Using the Run function \(Legacy\) action](#)

#### 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](#)

#### 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.

Automation Anywhere Version A2019 - 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).

## New features

### 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](#)

### 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](#)

### 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 | REST Web Service package | SOAP Web Service package](#)

### 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](#)

### Remove Git integration configuration (Service Cloud case ID: 00633948)

Enterprise A2019

Automation Anywhere Version A2019 - 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).

## New features

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](#)

## 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](#)

## 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](#)

## 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](#)

## 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.

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#### New features

- 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](#) | [Convert an existing device to a multi-user device](#) | [Configure RDP-based deployment for multi-user devices](#)

#### 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
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

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Supported packages	
Package	Version
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
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

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Supported packages	
Package	Version
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.  <a href="#">Using Capture area action</a>
Bot Scanner update  The Bot Scanner now displays error messages for bots that cannot be migrated to Enterprise A2019 in the summary report.  <a href="#">Analyze reports</a>
Flow view update

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#### Changed features

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](#)

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.

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Fixed features		
Build number	Service Cloud case ID	Description
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>HTMLInnerText</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	<p>The Automation Anywhere Elastic Search Service now restarts during the certificate retrieval process when you upgrade from Enterprise A2019.15 to Enterprise A2019.16.</p> <p>However, if you encounter any issues with the Automation Anywhere Elastic Search Service during the restart, see <a href="#">Elasticsearch Service fails to start during certificate retrieval process error during A2019.16 upgrade (A-People login required)</a>.</p>
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.
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.

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Fixed features		
Build number	Service Cloud case ID	Description
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.
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

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Fixed features		
Build number	Service Cloud case ID	Description
		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.
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.
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

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Fixed features		
Build number	Service Cloud case ID	Description
		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.
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.

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Security fixes	
Service Cloud case ID	Description
00631233	In the Database package, when you connect to the database, the username and password are no longer visible in the logs.

Known limitations
<p>When you are upgrading from an earlier version of Enterprise A2019 to the current version, the system displays the error message <b>Self Sign Certificate Failure</b>, and the installation process is rolled back if both the following conditions occur:</p> <ol style="list-style-type: none"><li>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.</li><li>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.</li></ol> <p>Workaround: Select No so that you can choose to enter the installation parameters during the upgrade.</p> <p><a href="#">Control Room upgrade fails with self signed certificate failure error (A-People login required)</a></p>
<p>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 alloElasticsearch 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.</p> <p>Workaround: Before upgrading to the current version, copy the existing Elasticsearch data from the non-default path to the default path.</p>
<p>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 <b>Unspecified</b>. Automation Anywhere packages that are installed on a server as a part of an upgrade show the Vendor as Automation Anywhere, which is expected.</p>
<p>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.</p>
<p>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.</p>
<p>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.</p>

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#### Known limitations

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.

## 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](#)

#### 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](#)

#### Create custom role user

Enterprise A2019

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#### New features

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](#)

#### 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.

#### 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.

#### 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 \(A-People login required\)](#)

HTTP proxy is not supported for On-Premises users.

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.

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## 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](#)

[IQ Bot A2019 version compatibility](#)

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](#)

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).
<a href="#">Create a learning instance in IQ Bot A2019</a>
Extract data from documents
Create a bot to extract data from documents using the learning instance you created.
<a href="#">Extracting information from documents</a>
Validate documents
Validate failed documents manually using the validator form.
<a href="#">Validate documents</a>
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.

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New features (using auto-extraction)

[IQ Bot \(Preview\) package](#)

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.

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.

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## 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: <ul style="list-style-type: none"><li>• Link or combine two images using Concatenate image</li><li>• Adjust the size of the selected image file using Edit image</li><li>• Enhance the image resolution and other aspects using Enhance image</li><li>• Change the image orientation such as angle using Orient image</li></ul> <a href="#">IQ Bot Pre-processor package</a>
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.  <a href="#">Add custom logic in IQ Bot to improve extraction</a>

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.

Known limitations
Migration of learning instances does not get completed if the IQBA file size is more than 2 GB.  Workaround: <a href="#">Migration of learning instance is not getting completed if the IQBA is more than 2GB (A-People login required)</a>
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.

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## 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](#)

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](#)

## 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](#)

Filter and search tasks

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## New features

### 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.](#)

### 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](#)

### 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 `$Task.assignedTo{username}$` and `$Task.assignedTo{email}$`.

### Enhancements to roles

### Enterprise A2019

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New features
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.
--	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.

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Fixed features	
Service Cloud case ID	Description
--	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.
--	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.

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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](#)
- [Discovery Bot](#)
- [IQ Bot](#)
- [Bot Insight](#)
- [Automation Anywhere Robotic Interface](#)

## Enterprise A2019

New features
Introducing Discovery Bot and Automation Anywhere Robotic Interface  Enterprise A2019  <a href="#">Discovery Bot   Automation Anywhere Robotic Interface</a>
Migration from 11.x and 10.x to A2019 ( <a href="#">currently available only to those in the Migration Early Adopter Program</a> )  Enterprise A2019

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## New features

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 AI-Sense Recorder enables you to perform an action on multiple objects of the same type.

### [Use variable anchor](#)

## 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](#)

## 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](#)

## 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

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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.  <a href="#">Using the Run function (Legacy) action</a>
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 devicelds, automationScheme, ownerlds, and consumerlds as parameters to create a device pool.  <a href="#">Create device pool API</a>

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

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Supported packages	
Package	Version
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
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

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Supported packages	
Package	Version
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
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.  <a href="#">Set up SAML authentication</a>
The Before and After fields in the String > Extract action are now optional (Service Cloud case ID: 00617151)

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Changed features
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.  <a href="#">Image Recognition package</a>

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.

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Fixed features	
Service Cloud case ID	Description
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.  <a href="#">Create a form</a>
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.

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Fixed features	
Service Cloud case ID	Description
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.
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):  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.
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 index out of bounds 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

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Fixed features	
Service Cloud case ID	Description
	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.
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 check.exe 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 Device yet to be determined in the Enterprise Control Room Activity page, and the user is

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Fixed features	
Service Cloud case ID	Description
	allowed to delete the device that has completed running a bot. The following message no longer appears: Device is part of active deployment.
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.	

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Known limitations
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.
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](#)

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.

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## 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](#)

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

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: <ul style="list-style-type: none"><li>• Convert image to PDF</li><li>• Get barcodes</li><li>• Get document info</li><li>• Get page content</li></ul> <a href="#">IQ Bot Pre-processor package</a>
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.  <a href="#">IQ bot Validator enhancements</a>
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.  <a href="#">Workload management</a>

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#### New features

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](#)

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](#)

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](#)

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 \(A-People login required\)](#)

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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.
--	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.

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## 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.
<a href="#">Configuring a Line Bar Chart query</a>
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.
<a href="#">Bot Insight visualizations</a>
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.
<a href="#">Operations dashboard</a>

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](#)

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 \$FormStep.input[]\$, the second form data is not evaluated.

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<p>Known limitations</p> <p>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.</p> <p>A team name that has a length of 20 characters or more is not accepted.</p>
<p>Limitations in AARI on the web</p> <p>Navigation bar</p> <p>When you open too many request tabs, the tabs are hidden in the navigation bar.</p> <p>Timestamp</p> <p>The timestamp of the closing step shows a duplicate timestamp of the starting step in request view.</p> <p>Imported process</p> <p>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.</p> <p>Workaround: You can check in and then check out the process, or import the process as private and then do a check-in.</p> <p>Configuration page</p> <p>In the device pool configuration page, the Bot Runner users check box cannot be deselected.</p> <p>Workaround: Double-click the check box in the header.</p> <p>Process management page</p> <p>A check-in process that is deleted from the Enterprise Control Room repository is still visible in the process management page.</p> <p>Form rendering</p> <ul style="list-style-type: none"><li>• The Masked data option is not fully supported for all elements. When this option is added to hide data, the data is visible.</li><li>• 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.</li><li>• The Document element is not fully supported. When this element is configured to a Default file path, the entire document is not rendered.</li><li>• 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.</li><li>• 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.</li><li>• 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 submitted in the request tab.</li><li>• The Select File element does not support the Open the doc in browser link. When this link is open in the initial form, the link redirects to the web main page.</li></ul>

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#### Known limitations

- When a process is configured with two forms that contain a Dropdown element, the process creation shares the Dropdown element data between the forms. However, when you view the data in the request tab, the Dropdown element in the second form does not receive data from the first form.

## 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](#)

## Enterprise A2019

#### 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](#)

- Version 11.3.1 and Version 11.3 are certified for migration to Enterprise A2019.

#### [Understanding Enterprise A2019 migration](#)

- Additional support is provided for packages and variables.

#### [Package mapping for migration | Variable mapping for migration](#)

- Migrate TaskBots and MetaBots created in 10.x to Enterprise A2019 using APIs.

#### [10.x Migration APIs](#)

#### Bypass legal disclaimer

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## New features

### 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 user](#)

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](#)

## 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 AI-Sense 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 AI-Sense Recorder.

### [Record a task with AI-Sense Recorder](#)

## 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.

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<p>New features</p> <ul style="list-style-type: none"><li>• You can now store the output of the Run stored procedure action in a dictionary variable.</li></ul> <p><a href="#">Using Connect action for database</a>   <a href="#">Using the Export to data table action</a>   <a href="#">Using the Run stored procedure action</a></p>
<p>New Active Directory package available</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p> <p><a href="#">Active Directory package</a></p>
<p>Log in securely when connecting to Active Directory server</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p> <p><a href="#">Using the Connect action</a>   <a href="#">Credentials and credential variables in the Bot editor</a>   <a href="#">User-defined variables</a></p>
<p>Support for Excel cell formats, including Number, Percentage, Currency, Scientific, and Date</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p> <p><a href="#">Excel basic package</a>   <a href="#">Loop package</a></p>
<p>Automate a task on a range of cells in an Excel worksheet</p> <p>Enterprise A2019 and Community Edition</p> <p>Specify a cell range in the Delete cells action to perform the operation on the cells in the range.</p> <p><a href="#">Excel advanced cell operations</a></p>
<p>New PDF package action</p> <p>Enterprise A2019 and Community Edition</p>

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<p>New features</p> <p>Merge multiple PDF files into a single PDF file using the Merge documents action.</p> <p><a href="#">Using the Merge documents action</a></p>
<p>Support for Czech and United States 2 code pages in Terminal Emulator package</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p> <p><a href="#">Using the Connect action</a></p>
<p>Proxy support for packages</p> <p>Enterprise A2019</p> <p>If a device is configured with a proxy, all outbound requests from the following packages are routed through the proxy server:</p> <ul style="list-style-type: none"><li>• Recorder</li><li>• REST Web Service</li><li>• SOAP Web Service</li></ul>
<p>Form builder enhancements</p> <p>Enterprise A2019</p> <p>The form builder now includes the following new elements:</p> <ul style="list-style-type: none"><li>• Dynamic - Enables dynamic rendering of the selected area.</li><li>• Snapshot - Enables you to take a snapshot of the form.</li></ul>
<p>Enhancements to actions in Interactive forms</p> <p>Enterprise A2019</p> <ul style="list-style-type: none"><li>• Enhanced highlight action<p>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.</p></li><li>• New Change label action<p>Use this action to change the label or title of the selected element of a specific form.</p></li><li>• Dynamic area action<ul style="list-style-type: none"><li>• The Add row in Dynamic area action enables you to append or overwrite a dynamic element of a form.</li></ul></li></ul>

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New features
<ul style="list-style-type: none"><li>The Clear action enables you to remove the dynamic elements.</li></ul>
<a href="#">Interactive forms package</a>
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.  <a href="#">Add a file and folder trigger</a>
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.  <a href="#">Record variable</a>
Product interface now available in Russian language  Enterprise A2019  Enterprise A2019 is now available in Russian.  <a href="#">Internationalization, localization, and language support</a>
Clone and view content in Enterprise Control Room  Enterprise A2019  The Enterprise Control Room now includes the following new permissions: <ul style="list-style-type: none"><li>View content: This permission allows you to view the contents of a cloned bot. This permission applies to both public and private workspaces.</li><li>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.</li></ul> <a href="#">Bot permissions for a role</a>
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.

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New features
<a href="#">If package</a>   <a href="#">Loop package</a>
<p>New encoding type in CSV/TXT and Log To File packages</p> <p>Enterprise A2019 and Community Edition</p> <p>The UTF-16LE encoding option provides support for files that contain the byte order mark (BOM) Unicode character. In the CSV/TEXT &gt; 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.</p> <p><a href="#">Using the Open action for CSV/TXT file</a>   <a href="#">Using Log To File action</a></p>
<p>Retrieve a list of available users using Device API</p> <p>Enterprise A2019</p> <p>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.</p> <p><a href="#">Device API</a></p>
<p>Manually configure time interval value of database connection retries property (Service Cloud case ID: 00573167)</p> <p>Enterprise A2019 and Community Edition</p> <p>You can manually configure the time interval value of the database connection retries in the cluster.properties file. If the database is reconnected within the time specified in the cluster.properties 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 cluster.properties file is 10000. The recommended maximum time for this property is up to 5 minutes (300000 msec).</p> <p>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.</p>
<p>Run as user to default device mapping in Workload automation (Service Cloud case ID: 00563115)</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p> <p><a href="#">Add queue, Bot Runner, and device pool</a></p>
<p>Authentication proxy support</p>

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#### New features

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
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

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Supported packages	
Package	Version
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
String	3.0.0-20200624-042145

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Supported packages	
Package	Version
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 <ul style="list-style-type: none"> <li>It is now optional to enter an input or output parameter name.</li> <li>You must specify the data type of an input parameter. Choose from Boolean, date, number, or string date type.</li> </ul>
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. <a href="#">Import bots</a>

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

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Fixed features	
Service Cloud case ID	Description
	now run successfully. The Enterprise Control Room does not show a preprocessing error when you deploy the TaskBots.
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.  <a href="#">Latest supported Visual C++ downloads</a>
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.
00569527	You can now perform a check-in and check-out of bots with dependencies.

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Fixed features	
Service Cloud case ID	Description
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-assignments\$ 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 <code>query did not return a unique result: 2</code> 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.
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.

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Known limitations
In Enterprise A2019 On-Premises, a security scan might report the Recorder package as malware because the check.exe 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.
<a href="#">Add packages to the Enterprise Control Room</a>
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.
There is an issue for a specific, manually generated license key file supplied by Automation Anywhere to upgrade from Enterprise A2019.13 to Enterprise A2019.14.  This issue applies only to customers who are in the following specific category (all must be true): <ol style="list-style-type: none"><li>1. Enterprise Control Room is at the customer premises</li><li>2. Enterprise Control Room is running Enterprise A2019.13 or earlier</li><li>3. Installed a license file that was provided to them in July 2020 (not self-generated through the customer self-service license portal)</li><li>4. User has upgraded the On-Premises Enterprise Control Room to Enterprise A2019.14.</li></ol>

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Known limitations
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</code> , <code>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](#)

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](#)

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.
<a href="#">Bots</a>

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New features
<p>Extract data from a table that spans across multiple pages (Service Cloud case ID: 00371795)</p> <p>IQ Bot On-Premises and Cloud</p> <p>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.</p>
<p>Add fields and field alias to custom domain (Service Cloud case ID: 00471075)</p> <p>IQ Bot On-Premises and Cloud</p> <p>You can now add additional fields (form or table) and field aliases to a custom domain for an existing learning instance.</p>
<p>Alert for successful or pending document validations</p> <p>IQ Bot On-Premises and Cloud</p> <p>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.</p>

Changed features
<p>Import custom domains from the staging to the production server in any order (Service Cloud case ID 00472445)</p> <p>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.</p>
<p><a href="#">Custom Domain in IQ Bot</a></p> <p>Validator enhancements (Service Cloud case ID: 00470258)</p> <p>Some of the Validator enhancements are as follows:</p> <ul style="list-style-type: none"><li>• 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.</li><li>• 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.</li></ul> <p>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</p>

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Changed features
<p>easier. However, if there is an invalid field, it continues to be displayed because the invalid field requires correction.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>

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
<b>IQ Bot On-Premises and Cloud</b>  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.
<b>IQ Bot On-Premises and Cloud</b>  If you log in to the Enterprise Control Room as an IQ Bot administrator, a 502 system error is displayed when you click the IQ Bot tab in the navigation bar.
<b>IQ Bot On-Premises and Cloud</b>

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#### Known limitations

You can view the ValidatorURL error message for a validated document along with the corrected field in the .csv 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](#)

#### 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](#)

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

## Enterprise A2019

### 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](#)

- Additional support is provided for packages and variables.

#### [Package mapping for migration | Variable mapping for migration](#)

### 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](#)

### 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%.

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## 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](#)

### 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](#)

### Capture scroll action and table using AI-Sense Recorder

You can now capture the scroll action in an application window and table control from a remote application when recording a task with AI-Sense Recorder.

#### [Record a task with AI-Sense Recorder](#)

### 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](#)

### 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](#)

### 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.

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New features
<a href="#">String package</a>
Automate in IBM-5555 terminals using the Terminal Emulator package  The TN5250E terminal type now supports the IBM-5555-C01 and D01 terminal models.  <a href="#">Terminal Emulator package</a>
Specify events within email trigger  For email triggers, specify an event within the server type (Outlook, Email, or EWS server) to trigger a bot.  <a href="#">Add an email trigger</a>
Use hot key for interface trigger  For interface triggers, you can select hot key as one of the conditions to trigger the bot  <a href="#">Add an interface trigger</a>
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.  <a href="#">Interactive forms package</a>
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.  <a href="#">File package   Folder package</a>
New conditions in the If and Loop packages <ul style="list-style-type: none"><li>• Use the Data table &gt; Data table is empty condition to execute actions based on whether the specified table contains values.</li><li>• Use the Data table &gt; Number of columns and Data table &gt; 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.</li></ul> <a href="#">If package   Loop package</a>
Generate a random string of a user-specified number of characters and assign it to a string variable

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#### New features

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](#)

#### 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 | Installing Enterprise Control Room on Linux](#)

#### Supported packages

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

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Supported packages	
Package	Version
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
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

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Supported packages	
Package	Version
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.
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.

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Changed features
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 Processing failure 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.
--	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.

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Fixed features	
Service Cloud case ID	Description
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.
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.

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Fixed features	
Service Cloud case ID	Description
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 name field of the PROPERTIES control, the bot does not deploy successfully. This issue occurs because Dictionary/Table variables are not supported for the name field in the PROPERTIES control. You can pull the name value into a String or Number variable before using it in the PROPEPTIES 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 href="#">A-People Downloads page (Login required)</a> .
When you capture a table control from an application using the AI-Sense 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 C:\Program Files. Note: This is applicable only to a Windows-based installation.
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: <ul style="list-style-type: none"> <li>If you drag any form element into a specific position on the form builder, it always appears at the bottom of the available elements.</li> <li>If you drag form elements around in the form builder screen in Internet Explorer, the mouse pointer flickers continuously.</li> </ul>

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Known limitations
<ul style="list-style-type: none"><li>For the Radio button element, you cannot set the default selection in Advance behaviors.</li><li>For the Checkbox element, changes made to the check box names in the Checkbox content field are not updated when you enable Advance behaviors &gt; Make default selections.</li></ul>
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.

## 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](#)

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](#)

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.

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#### New features

##### [Upgrade earlier IQ Bot versions to IQ Bot A2019 On-Premises](#)

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.
00471068, 00339407	The draw box functionality for field labels now ensures that the selected value is treated as an entire word rather than distinct

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Fixed features	
Service Cloud case ID	Description
--	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.
00481720	The PDF Box feature now enables you to generate an SIR for a PDF file that contains content in multiple formats.
00510286, 00548393	<p>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.</p> <p>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.</p>
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
<b>IQ Bot On-Premises</b> <p>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:</p> <p><a href="#">A-People Downloads page (Login required)</a>.</p>
<b>IQ Bot On-Premises and Cloud</b> <p>Images on the Designer in IQ Bot appear distorted while scrolling in Internet Explorer.</p>
<b>IQ Bot On-Premises and Cloud</b> <p>Installation errors are displayed for the Database Migration Assistant.</p>

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#### Known limitations

Workaround: Install the MsSqlCmdLnUtils utility and Microsoft OCDB Driver 17 for SQL Server before installing the Database Migration Assistant.

#### IQ Bot On-Premises and Cloud

Logs are not captured if the Database Migration Assistant installation fails.

#### 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](#)

##### 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](#)

#### 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](#)

##### Bot Insight APIs

- All of the parameters are now optional.

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#### Changed features

- 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](#)

## 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. After you are on Build 4111, an update to Bot agent 7.0.4789 is also required. 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

#### 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](#)

- 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](#)

- (11.x only) Additional support is provided for packages and variables.

#### [Package mapping for migration | Variable mapping for migration](#)

- (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.

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New features
<a href="#">Migration APIs   Repository Management API</a>
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.
<a href="#">Integrating Enterprise Control Room with Git repositories</a>
Additional actions in the Interactive forms package
Enterprise A2019 and Community Edition
The Interactive forms package includes the following actions:
<ul style="list-style-type: none"><li>• Set focus: Sets the focus on the selected form element.</li><li>• Highlight: Highlights the selected element of a form.</li><li>• Unhighlight: Removes the highlight from the selected element of a form.</li></ul>
<a href="#">Interactive forms package</a>
Form builder enhancements for interactive forms
Enterprise A2019 and Community Edition
The form builder includes the following elements:
<ul style="list-style-type: none"><li>• Document: Use this element to render an image (.jpg) or PDF file along with the form.</li><li>• Password: Use this element for a field that requires masking of the input data.</li></ul>
<a href="#">Create a form</a>
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.
<a href="#">Considerations for running a bot</a>
New features in Universal Recorder and actions that use the recorder feature

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## New features

### 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 | Secure recording mode](#)

### 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](#)

### 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](#)

### 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](#)

### Store string values securely in a credential variable

### Enterprise A2019 and Community Edition

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#### New features

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](#)

#### 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 | Loop package](#)

#### 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.

#### 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](#)

#### Configure Wait package actions to terminate a running bot if a condition is unsatisfied

Enterprise A2019 and Community Edition

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#### New features

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](#) | [Using Wait for window action](#)

#### 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](#)

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](#)

Return the Bot agent installation path using the system variable AAInstallationPath

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.

GDPR self-reporting

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#### New features

##### 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

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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

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Supported packages	
Package	Version
Screen	2.0.0-20200418-005625
SNMP	2.0.0-20200418-005627
SOAP Web Service	3.0.0-20200418-005630
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.  <a href="#">Upgrade from earlier Enterprise A2019 versions to latest version</a>
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.
<a href="#">Using the Get cell address action</a>
Edit a work item without changing its status

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Changed features
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.
<a href="#">Edit work items</a>
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.  <a href="#">View work items</a>   <a href="#">Edit queues</a>

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.

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Fixed features	
Service Cloud case ID	Description
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.
--	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.

Automation Anywhere Version A2019 - 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).

Fixed features	
Service Cloud case ID	Description
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.
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 <a href="#">Uninstall Enterprise A2019 On-Premises from Linux server</a> . 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:
<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>A blank page is displayed on the form builder when you paste content into any of the existing form elements.</li> <li>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.</li> </ul>
Cloud-enabled deployments only support local authentication.
Linux is not supported for Cloud-enabled On-Premises installations.

Automation Anywhere Version A2019 - 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).

Known limitations
<ul style="list-style-type: none"><li>• 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.</li><li>• You cannot simultaneously insert work items from multiple devices in a queue.</li><li>• You cannot create a draft queue.</li><li>• 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.</li><li>• 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.</li></ul> <p>Workaround: Pause and resume the WLM automation.</p>
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](#)

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
<p>IQ Bot On-Premises</p> <p>IQ Bot registration is not supported for Cloud-enabled On-Premises installations.</p>

Automation Anywhere Version A2019 - 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).

## 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](#)

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](#)

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 deletetasklogdata API is updated to include the `runId` parameter. The getbotrundata API retrieves information about the vital statistics of the bot. The getaudittraildata API retrieves information about the audit data that is logged for all users.

[Bot Insight API](#)

### Related concepts

[Upgrade to Enterprise A2019](#)

### Related tasks

[Upgrade from earlier Enterprise A2019 versions to latest version](#)

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## [Upgrading IQ Bot A2019](#)

# 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: Enterprise A2019.11 includes a required update to your Bot agent. Ensure that you complete the update to continue with your automation activities. [Manually update the Bot agent](#)

New features
Migrate 11.x TaskBots and MetaBots to A2019  Enterprise A2019 <ul style="list-style-type: none"><li>• Additional support is provided for packages and variables.  <a href="#">Package mapping for migration</a>   <a href="#">Variable mapping for migration</a></li><li>• You can now migrate MetaBots (with DLLs) and their components from 11.x to A2019. You cannot migrate screen-based MetaBots.  <a href="#">How MetaBots are migrated</a><ul style="list-style-type: none"><li>• Use the Bot Scanner to analyze MetaBots to determine if they can be migrated to A2019.</li><li>• Verify the list of certified 11.x bot versions available for migration: <a href="#">Understanding Enterprise A2019 migration</a></li></ul></li></ul>
Bot Store integration with the Enterprise Control Room  Enterprise A2019 <p>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.</p> <p>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.</p> <p><a href="#">Bot Store</a></p>
Use interactive forms in a bot

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## New features

### 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](#)

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](#) | [Create a global value](#) | [Overwrite the default value](#)

## 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](#) | [Edit device pools](#) | [Edit work items](#) | [Use Work Item variables](#)

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.

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## New features

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

### [File package](#)

#### 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 | Example of using a conditional statement](#)

## 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

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New features
<ul style="list-style-type: none"><li>• Window</li></ul>
<a href="#">Universal Recorder overview</a>
New features in the Excel advanced package Enterprise A2019 and Community Edition
<ul style="list-style-type: none"><li>• In the Replace action, you can choose to replace cell values with an empty character.</li><li>• In the Get cell address action, you can choose to save the retrieved cell address to a string variable.</li></ul>
<a href="#">Using the Replace action</a>   <a href="#">Using the Get cell address action</a>
Add DLL dependencies
Enterprise A2019 and Community Edition
As a bot creator, you can use a DLL that refers to a child DLL.
<a href="#">Bot dependencies</a>
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.
<a href="#">Distributed architecture with HA/DR support</a>   <a href="#">HA cluster configuration overview</a>
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
<ul style="list-style-type: none"><li>• Insert a Pause action to temporarily pause the running bot.</li><li>• Insert a Stop action to terminate the running bot.</li></ul>
<a href="#">Task Bot package</a>
Automate printer settings

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New features
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  <a href="#">System variables</a>
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.  <a href="#">JavaScript package</a>   <a href="#">Python Script package</a>   <a href="#">VBScript package</a>
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.  <a href="#">Edit device pools</a>

## 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

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Package	Version
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
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

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Package	Version
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
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.  <a href="#">Dictionary package</a>
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.

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Changed features
Service Cloud case ID: 00440072
<a href="#">Schedule   Workload management</a>

## 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.
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.

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Service Cloud case ID	Description
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.
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:  <a href="#">Interactive forms not available in A2019.11 On-Premises (A-People login required)</a>
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.

Automation Anywhere Version A2019 - 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).

### [IQ Bot A2019 version compatibility](#)

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.

#### [Upgrading IQ Bot A2019](#)

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.

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## 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](#)

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](#)

## 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

### 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](#)

Automation Anywhere Version A2019 - 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).

<p>New features</p> <ul style="list-style-type: none"><li>Additional support is provided for packages and variables. <a href="#">Package mapping for migration</a>   <a href="#">Variable mapping for migration</a></li><li>Multiple Bot Runner users are supported for bot migration. <a href="#">Migrate Enterprise bots</a></li></ul>
<p>AI-Sense Recorder to capture objects from remote applications</p> <p>This is a Beta release on Enterprise A2019 (Cloud deployment only) and Community Edition</p> <p>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).</p> <p><a href="#">Record a task with AI-Sense Recorder</a></p>
<p>Manage your automation as Work Items for resource optimization and workload automation</p> <p>Enterprise A2019 and Community Edition</p> <p>Divide your automation into small, logical modules called Work Items using the new <a href="#">Workload Management</a> feature. Process these Work Items simultaneously using queues to ensure that your organization's automation goals are achieved with optimum resource utilization.</p> <p>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.</p> <p><a href="#">Workload management</a></p>
<p>Install Enterprise Control Room on Red Hat Enterprise Linux 7.7 and Linux CentOS 7.7</p> <p>Enterprise A2019</p> <p>Use the command line to install your Enterprise Control Room on your Linux servers in the datacenter.</p> <p><a href="#">Installing Enterprise Control Room on Linux</a></p>
<p>Use wildcard characters in folder and file path fields in the Encrypt and Decrypt actions</p> <p>Enterprise A2019 and Community Edition</p> <p>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.</p>

Automation Anywhere Version A2019 - 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).

New features
<p><a href="#">Encrypt   Decrypt</a></p> <p>Use system variables to return data from the computer that is connected to the running Bot agent Enterprise A2019 and Community Edition</p> <p>You can use the following system variables:</p> <ul style="list-style-type: none"><li>• AAControlRoom: Returns the URL of the Enterprise Control Room.</li><li>• CPUUsage: Returns the percentage utilization of the CPU.</li><li>• RAMUsage: Returns the RAM usage in megabytes.</li><li>• OSName: Returns the operating system.</li><li>• TotalRAM: Returns the total amount of RAM available.</li></ul>
<p>Automate tasks in Oracle EBS and Forms with the Universal Recorder</p> <p>Enterprise A2019 and Community Edition</p> <p>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:</p> <ul style="list-style-type: none"><li>• Window/Tab</li><li>• Button</li><li>• Text box</li><li>• Label (read-only)</li><li>• Radio button</li><li>• Check box</li><li>• Table/Grid</li><li>• Scroll bar</li><li>• Menu</li><li>• Combo-box/Drop-down list</li></ul>

## 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

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Package	Version
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
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

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Package	Version
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
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.
<a href="#">Analyze reports</a>  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.  <a href="#">KB article: Change database server after A2019 Control Room installation (A-People login required)</a>

Automation Anywhere Version A2019 - 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).

## 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.
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](#)

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#### 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](#)

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](#)

#### 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](#)

#### 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](#)

#### Exporting data from widgets

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## New features

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

## 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

## 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>

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## 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).

### 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	<p>Migrate 11.3.x TaskBots to A2019.</p> <ul style="list-style-type: none"><li>• 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. <a href="#">Bot Scanner overview</a></li><li>• Migrate multiple TaskBots with dependent TaskBots using a single Run-as user. <a href="#">Migrate Enterprise bots</a></li><li>• 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. <a href="#">Migrate Enterprise bots</a></li><li>• Analyze the status of individual bot migrations and identify any unsupported commands or attributes associated with the migrated bot and its dependencies. <a href="#">Migration reports</a></li><li>• Additional support is provided for packages and variables.</li></ul>

Automation Anywhere Version A2019 - 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).

Feature	Description
	<a href="#">Package mapping for migration</a>
SAML 2.0	<p>Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).</p> <p><a href="#">Set up SAML authentication</a></p>
Bot Deploy API	<p>The Bot Deploy API now includes <code>/automations/deploy</code> and is introduced to support the <code>runAs user</code> feature for Bot deployment.</p> <ul style="list-style-type: none"> <li>• The Bot Deploy API works only in Enterprise public accounts, and not in Community Edition.</li> <li>• The API supports callback URL for environments that have both the Enterprise Control Room and callback server on the same network.</li> </ul>
Geo Presence	<p>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.</p>
Exchange Web Services support	<p>Actions in the Email package enable users to automate email-related operations using Exchange Web Services (EWS).</p> <p><a href="#">Email package</a></p>
Variables in place of an index or key value	<p>Data table, dictionary, list, and record type variables can express index and key values as variables.</p> <p><a href="#">Simple variable types</a></p>
Copy bot	<p>The copy bot functionality retains the metadata of the original bot, including captured images, recorded objects, called files, and child bots.</p> <p><a href="#">Copy a bot</a></p>
Excel actions to retrieve cell, column, or row location	<p>The following actions enable users to retrieve location information from an Excel sheet and save it to a variable.</p> <ul style="list-style-type: none"> <li>• <a href="#">Get cell address</a></li> </ul>

Automation Anywhere Version A2019 - 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).

Feature	Description
	<ul style="list-style-type: none"> <li>• <a href="#">Get column</a></li> <li>• <a href="#">Get row</a></li> </ul>
Recorder enhancements	Users can discard the most recently captured object while the Recorder is running.

## Supported packages

Package	Version
Node Manager	1.0.1891
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

Automation Anywhere Version A2019 - 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).

Package	Version
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
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

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## Changed features

Feature	Description
Office 365 packages authorization	Authorize each Office 365 package separately through the Connect package in each package. <a href="#">Using the Connect action</a>

## 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 <a href="#">Switch Bot agent to a different Enterprise Control Room</a> .
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](#).

## 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](#).

## 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](#)

Automation Anywhere Version A2019 - 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).

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

### [IQ Bot A2019 version compatibility](#)

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](#) 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	<p>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.</p> <p><a href="#">Adding a dashboard widget</a></p>

### **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.

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## 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).

## 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	<p>The Automation Anywhere pre-migration utility evaluates your 11.x bots for migration to A2019.</p> <p>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.</p> <p>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.</p>
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.

Automation Anywhere Version A2019 - 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).

Feature	Description
Action localization	Labels, buttons, and tooltips are localized to the supported language set.
Updated action packages	<ul style="list-style-type: none"> <li>Additional REST Web Service error codes for better troubleshooting of API calls</li> <li>PGP package for encrypting and decrypting files</li> <li>Improvements to SAP actions</li> </ul>
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

Automation Anywhere Version A2019 - 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).

Package	Version
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
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

Automation Anywhere Version A2019 - 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).

## 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](#).

## 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](#).

## 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](#).

## 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

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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	<p>The Operation dashboard in Bot Insight displays the Audit dashboard.</p> <p>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.</p> <p>See <a href="#">Operations dashboard</a>.</p>
Analytic visualization widgets	<p>The following new widgets are added:</p> <ul style="list-style-type: none"><li>• Stacked Bar Chart</li><li>• Clustered Bar Chart</li></ul> <p>See <a href="#">Adding a dashboard widget</a>.</p>

## 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.

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## 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.

### 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.

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Feature	Description
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

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Package	Version
List	2.0.0-20191017-030447
LogFile	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
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.

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## 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](#).

## 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](#).

## 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](#).

## 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](http://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.

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## 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 <a href="#">Editing a data profile</a> .
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 <a href="#">Delete task log data</a> .

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Feature	Description
Business data profile API	<p>Use this API to extract the business data profile logged in Bot Insight.</p> <p>See <a href="#">Get bot variables data</a>.</p>
Business data API	<p>Use this API to extract the business data logged in Bot Insight.</p> <p>See <a href="#">Get task log data</a>.</p>
Resize dashboard widgets	<p>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.</p> <p>See <a href="#">Editing a dashboard widget</a>.</p>
US map widget	<p>The US Map widget enables you to visualize and analyze information about Country, State, City, and Zip Code.</p> <p>See <a href="#">Adding a dashboard widget</a>.</p>
World map widget	<p>The World Map widget enables you to visualize and analyze information about Country, State, Zip Code, Latitude, and Longitude.</p> <p>See <a href="#">Adding a dashboard widget</a>.</p>
Parent child dashboard	<p>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.</p> <p>See <a href="#">Bot Insight dashboards</a>.</p>
Notification of variable updates in the standard dashboard	<p>Data profile updates are highlighted with a red dot in the standard dashboard.</p> <p>See <a href="#">Customizing a dashboard</a>.</p>
Data logging	<p>When you deploy and run a bot on the Bot Runner machine, Bot Insight aggregates all the information</p>

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Feature	Description
	about that bot. The published dashboard for that bot displays the aggregated bot information. See <a href="#">Bot Insight dashboards</a> .
Bot Insight	The Analyze package provides the following functions to enable business analytics in the Bot Insight dashboard: <ul style="list-style-type: none"><li>• Analyze Open</li><li>• Analyze Close</li></ul>

## 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

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Feature	Description
	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](#).

## Changed features

IQ Bot A2019 (Build 550) Changed Features	
Issue	Description
Language toggle UI redesigned	<p>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.</p> <p>User can select a language from either the Enterprise Control Room or IQ Bot language toggle icon.</p> <p>Note: After logging out of the system, the system performs a reset. This requires the user to select the language again at login.</p>
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.

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## 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).

### 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: <ul style="list-style-type: none"><li>• A universal recorder to simplify capturing processes</li><li>• List and Flow views for TaskBot creation</li><li>• Powerful bot code management capabilities</li><li>• Rich variable passing with no cross-language mapping required</li></ul>
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.

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Feature	Description
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.
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: <ul style="list-style-type: none"> <li>• Analyze Open</li> <li>• Analyze Close</li> </ul>

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

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Package	Version
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
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

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## 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	<p>Bot Insight has the following limitations:</p> <ul style="list-style-type: none"><li>• Bot Insight dashboard does not support Drag and Drop to move and arrange the dashboard widgets within the dashboard.</li><li>• The Date widget in the dashboard displays the Unix time stamp.</li><li>• Bot Insight does not support the Aggregate By feature in the Table widget, if the table contains a Timestamp.</li><li>• Once the bots run successfully, the default dashboard is generated after 5 to 10 seconds.</li></ul>

## 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](#)
- [Bot development](#)

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- Bot extensibility and code reuse
- Integration capabilities
- Device utilization capabilities
- Recorder capabilities
- Bot packages
- Variables support

## Core components

	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Target user	<ul style="list-style-type: none"> <li>• Citizen Developer</li> <li>• Specialist/RPA Developer</li> <li>• IT</li> </ul>	<ul style="list-style-type: none"> <li>• RPA Developer</li> <li>• IT</li> </ul>	<ul style="list-style-type: none"> <li>• RPA Developer</li> <li>• IT</li> </ul>
Delivery model	<ul style="list-style-type: none"> <li>• Software as a Service (SaaS)</li> <li>• On-Premises</li> </ul>	<ul style="list-style-type: none"> <li>• On-Premises</li> <li>• Hybrid Cloud</li> </ul>	<ul style="list-style-type: none"> <li>• On-Premises</li> <li>• BotFarm (for Bot Runners)</li> </ul>
Operating system	<ul style="list-style-type: none"> <li>• Microsoft Windows</li> <li>• Linux (Linux CentOS 7.7, Red Hat Enterprise Linux 7.7)</li> </ul>	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)
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

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	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
Upgrade to use new actions or commands	<ul style="list-style-type: none"> <li>No upgrade required for Cloud</li> <li>Upgrade required for On-Premises</li> </ul>	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
Multi-domain support	Available	Available	Available
Hosting technology	Java	Java	Microsoft IIS
Role-based access	Available	Available	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
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

Automation Anywhere Version A2019 - 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).

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

## 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

Automation Anywhere Version A2019 - 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).

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
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

## Recorder capabilities

Feature	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
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

Automation Anywhere Version A2019 - 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).

## Bot packages

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
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
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

Automation Anywhere Version A2019 - 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).

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
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	Not available	Not available
Office 365 OneDrive	Available	Not available	Not available
One Drive	Available	Not available	Not available
PDF	Available	Available	Available
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

Automation Anywhere Version A2019 - 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).

Feature	Enterprise A2019 packages	Enterprise Version 11.3.x commands	Enterprise Version 10.x commands
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			
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

Automation Anywhere Version A2019 - 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).

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

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Variable	Enterprise A2019	Enterprise Version 11.3.x	Enterprise Version 10.x
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
File DataColumn	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
Table Column	Not available	Available	Available
TotalRAM	Available	Available	Available
Trigger	Available through Interface trigger	Available	Available
Year	Available	Available	Available
XMLDataNode	Not available	Available	Available

#### Related concepts

[Enterprise A2019 Release Notes](#)

[Package Software Development Kit \(SDK\)](#)

[Related reference](#)

Automation Anywhere Version A2019 - 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).

[Enterprise Control Room operating system compatibility](#)

[Enterprise A2019 FAQ](#)

[Variable mapping for migration](#)

[Global values](#)

[Recursive expressions](#)

## 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: <ul style="list-style-type: none"><li>• Invoices</li><li>• Purchase orders</li><li>• Bank statements</li><li>• Credit memo</li><li>• Utility bills</li></ul>	Yes
User confidence threshold	Yes	No	No	Yes
Learning instance creation/editing	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	No	No	Yes
Caching (enhanced performance)	Yes	Yes	Yes	Yes
Bot creation/editing/deletion	Yes	Yes	Yes	Yes

Automation Anywhere Version A2019 - 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).

IQ Bot basic features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Designer/Preview/Test	Yes	Yes	Yes	Yes
Production toggle	Yes	Yes	Yes	Yes
Validator	Yes	Yes	Yes	Yes
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

Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Original IQ Bot text segmentation/document	Yes	No	No	Yes

Automation Anywhere Version A2019 - 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).

Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
classifier from IQ Bot Version 5.3.0/6.0				
New IQ Bot text segmentation/document classifier from IQ Bot Version 5.3.1/6.5	Yes	Yes	Yes	Yes
Option to select classifier version of existing learning instances during IQ Bot upgrade: <ul style="list-style-type: none"><li>• Version 1 (IQ Bot 5.3.0 or before 6.0)</li><li>• Version 2 (IQ Bot 5.3.1/Version 6.5 Beta)</li></ul>	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
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

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Extraction/validation features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
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
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

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	Yes	No	No	Yes

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Enterprise features	IQ Bot A2019			IQ Bot 11.3.x
	On-Premises	Cloud	Community Edition	
Amazon Relational Database Service (RDS) out of the box				
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:	<ul style="list-style-type: none"> <li>• Chinese Simplified</li> <li>• Chinese Traditional</li> <li>• French</li> <li>• German</li> <li>• Japanese</li> <li>• Korean</li> <li>• Spanish</li> <li>• Italian</li> <li>• Portuguese</li> </ul>	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

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:

Automation Anywhere Version A2019 - 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).

IQ Bot A2019 On-Premises	Enterprise Control Room
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, support, access to the Bot Store, and courses on Automation Anywhere University.

Automation Anywhere Version A2019 - 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).

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How is Enterprise A2019 deployed?

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 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 Adoption Framework, Center for Information Security (CIS) baselines, and others.

Related concepts

[Enterprise A2019 Release Notes](#)

## 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.

Automation Anywhere Version A2019 - 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).

## Overview

### Enterprise A2019 components

#### 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](#)

#### 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 upgrade IQ Bot A2019](#)

#### 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.

#### [Business analytics through Bot Insight](#)

#### Bot Store

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](#)

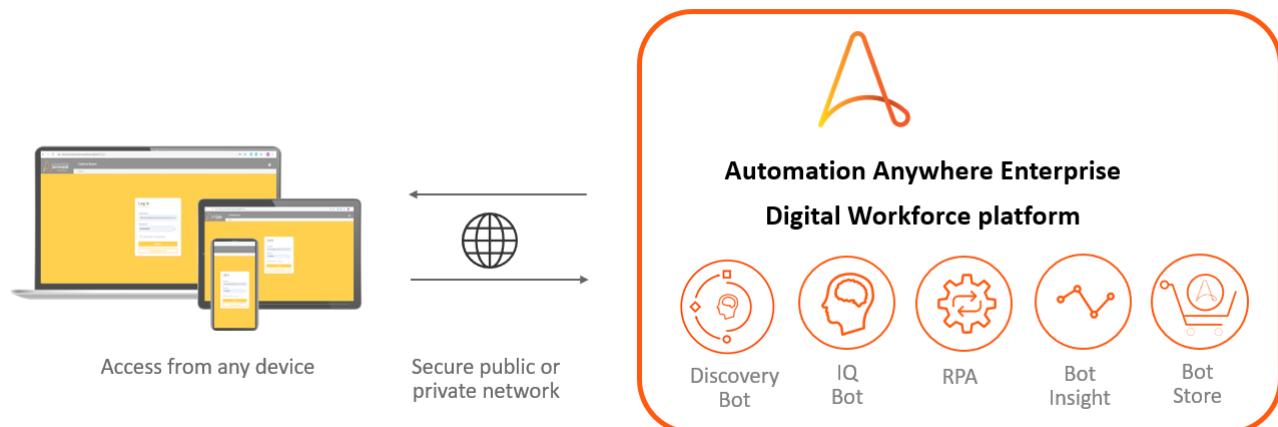
#### Private Bot Store

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](#)

The following image shows the components of Enterprise A2019:

Automation Anywhere Version A2019 - 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).



## 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

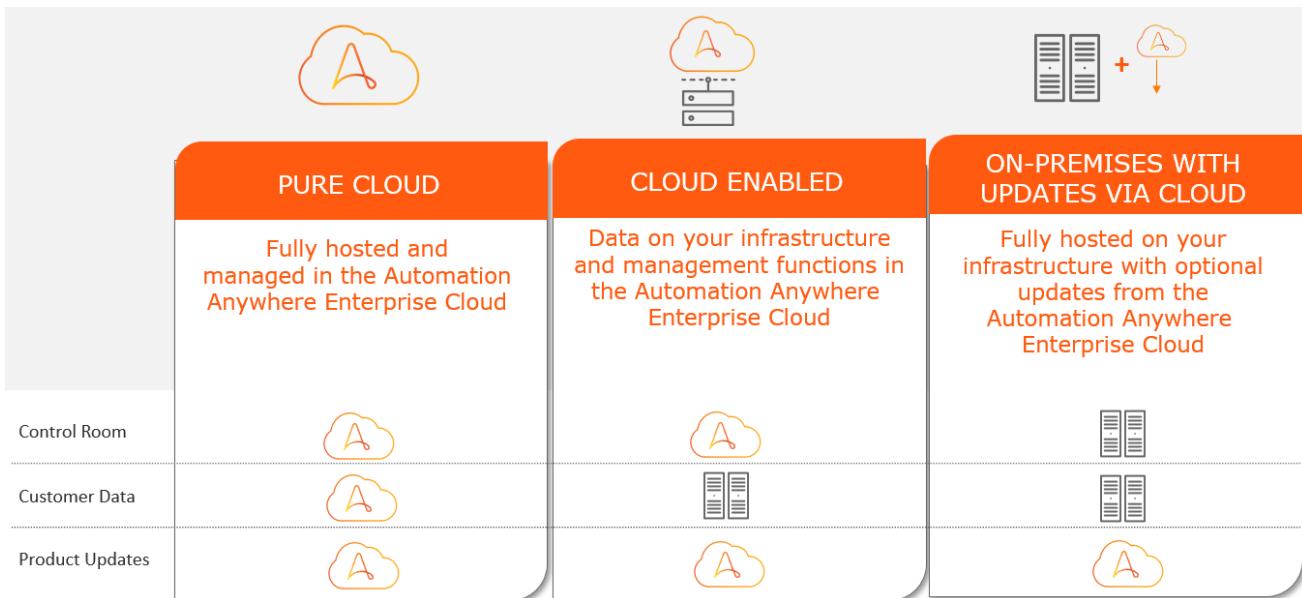
Offers a SaaS experience while data is hosted On-Premises with lower total cost of ownership (TCO). This deployment model is suitable for customers who have to adhere to strict regulatory norms where data sovereignty is mandatory.

### On-Premises with updates through Cloud

Fully On-Premises deployment with control over receiving updates and new capabilities from the Cloud.

Automation Anywhere Version A2019 - 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).

The following image shows the deployment models for Enterprise A2019:



- [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.

- [Distributed Architecture](#)

Automation Anywhere platform is deployed using a distributed architecture.

- [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.

Related information

[Automation Anywhere Enterprise RPA Platform](#)

[What is RPA?](#)

[RPA for Business Process Outsourcing \(BPO\)](#)

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

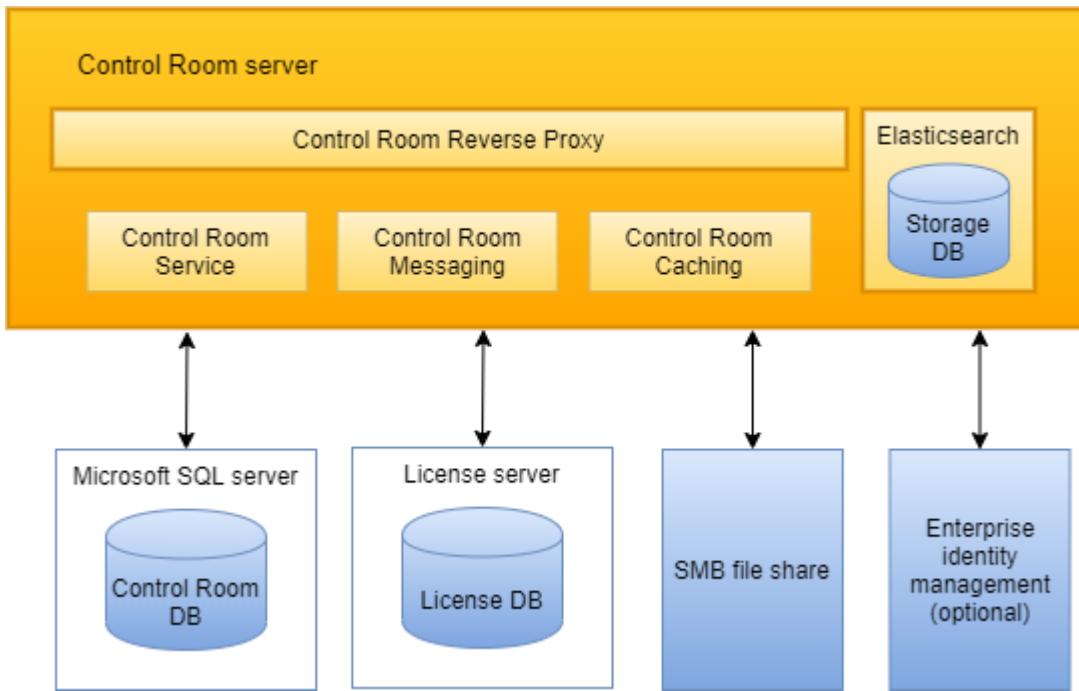
## Enterprise Control Room overview

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.

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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

Automation Anywhere Version A2019 - 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).

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

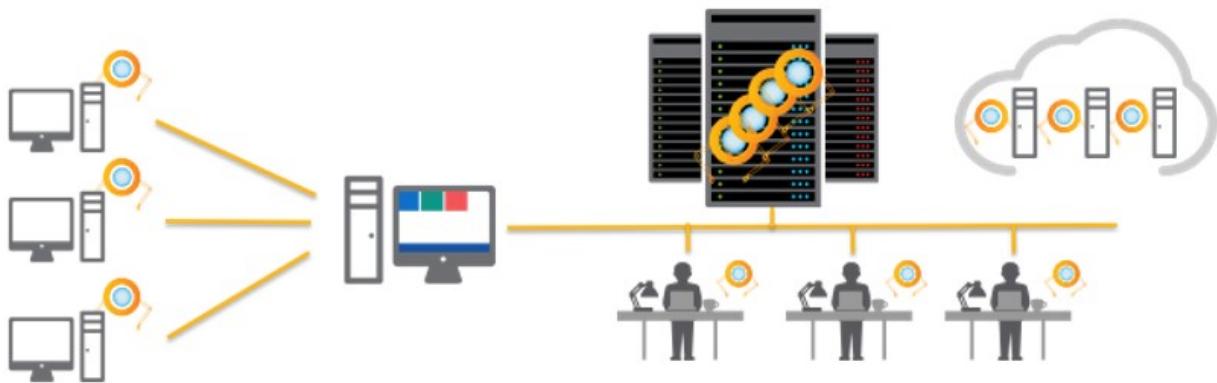
- Enterprise Control Room dashboards provide a single view of the entire automation infrastructure.
- Enterprise Control Room receives real time heartbeat and telemetry from automations with events, exceptions and alerts.
- Unauthorized users cannot pause, resume or stop any of the ongoing automations 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.

**Bot Creators → Control Room → Bot Runners**



- **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.

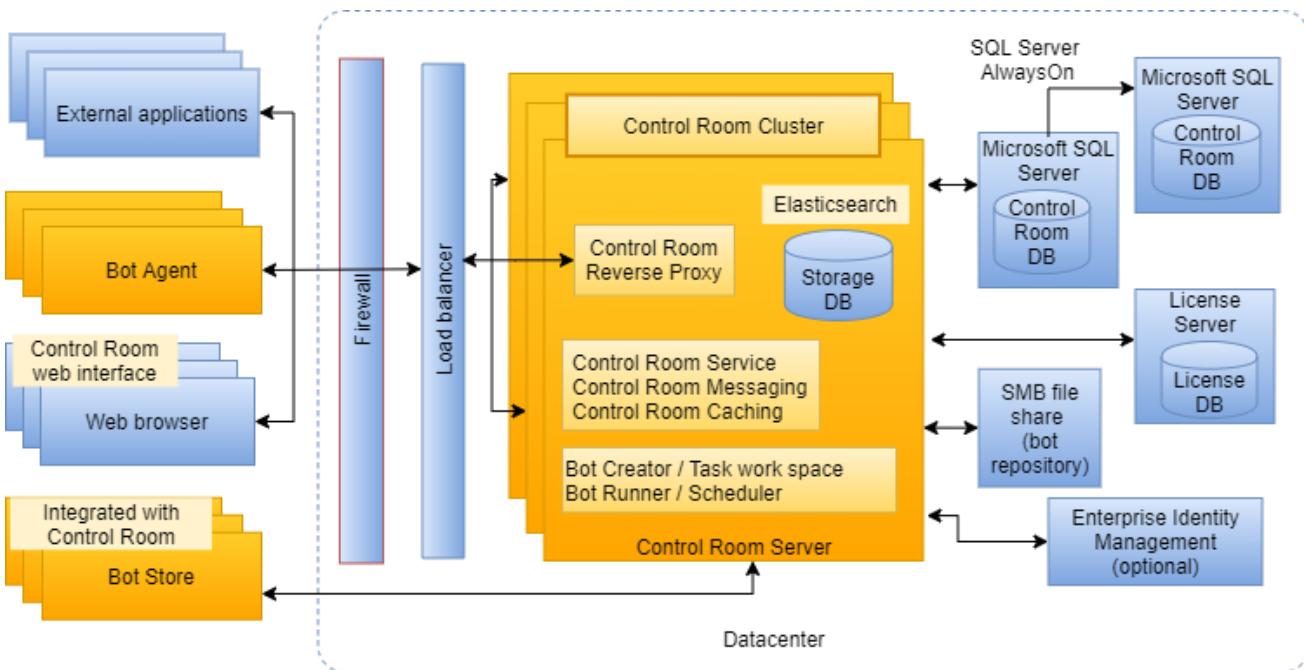
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## Distributed architecture with HA/DR support

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.

## 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.

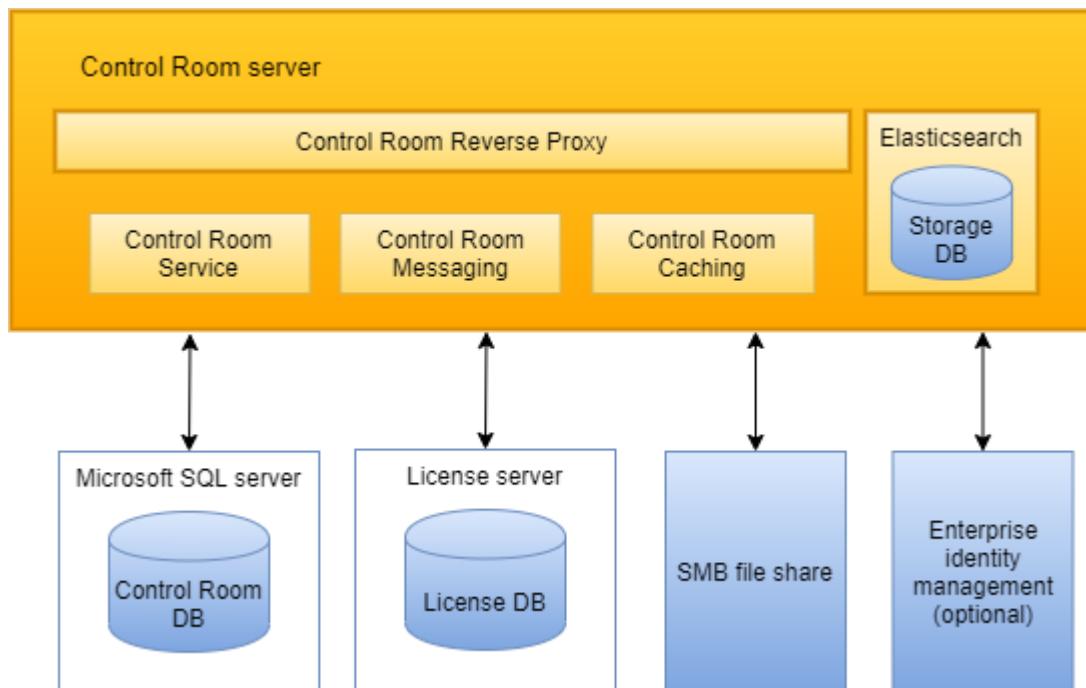
All communication between authorized and authenticated Bot Creators, Bot Runners, and the Enterprise Control Room use secure protocols and pass through a network firewall and a load balancer, based on customer deployment topology consistent with best practices as defined by NIST SC-7 Boundary Protections

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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.

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## 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](#)

- 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](#)

- 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](#)

## 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.

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.

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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](#)

## 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:

Video providing an introduction to Private Bot Store

Related concepts

[Getting started with Private Bot Store](#)

## 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.

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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, for example, CyberArk. 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.

- [Security architecture model](#)

Automation Anywhere Cognitive security architecture is founded on Least Privilege principles and a

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strict Separation of Duty model with 41 technical controls implemented across seven NIST Control families.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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).

- [Support for secure protocols](#)

The Automation Anywhere platform supports secure protocols, for example, TLS 1.2 and HTTPS data transfer.

- [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.

- [Change management](#)

Access restrictions for configuration management.

- [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.

- [Defenses against common vulnerabilities](#)

The Automation Anywhere Enterprise platform provides some defenses against common attacks on applications.

- [Compliance and vulnerability scanning](#)

- [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.

- [Additional security controls](#)

Automation Anywhere Enterprise Control Room restricts the database connection configuration with the system administrator account.

Related information

[Enterprise RPA Security](#)

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## 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	<p>Enforce access restrictions for change control and least privileges on system components:</p> <ul style="list-style-type: none"><li>• Fine grained access to bots and Bot Runners is controlled via RBAC,</li><li>• Bot and Bot Runner domains can be assigned to roles via RBAC</li><li>• RBAC roles are fully audited</li></ul>
	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

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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.
Controlled maintenance	MA-2	Automated maintenance	Enterprise Control Room versioning system provides an automated mechanism to roll out updates to bots,

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Control Family	Control Code	Enterprise Control Room Feature	Security Impact
			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](#)

This topic outlines secure deployment models, data element locations, and operational responsibilities.

## Cloud operational responsibilities

This topic outlines 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 the 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-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 via Cloud

With Automation Anywhere On-Premises with updates via 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.

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Table 1. Securing Data and Operations Responsibilities

Data Requirement	Pure Cloud	Cloud-Enabled	On-Premises with updates via 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

Table 2. Data Types and Storage Locations

Data Type	Pure Cloud	Cloud-Enabled	On-Premises with updates via Cloud
Customer Business Data <ul style="list-style-type: none"> <li>• Customer Personal Data</li> <li>• Business data used in automation</li> </ul>	Cloud	Customer network	Customer network
Operational Data <ul style="list-style-type: none"> <li>• Operations users, roles, passwords</li> <li>• Device information</li> <li>• Device credentials</li> <li>• Bot schedule</li> <li>• Bot definition</li> <li>• Audit and application logs</li> <li>• WLM definitions and schedules</li> </ul>	Cloud	Customer network	Management shared: Cloud Action package updates Customer All other data management
Personal Data	Cloud	Customer network	Customer network

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Data Type	Pure Cloud	Cloud-Enabled	On-Premises with updates via Cloud
<ul style="list-style-type: none"><li>• Username and password</li><li>• Security key</li><li>• User device information and credentials</li><li>• Bot Runner device access</li><li>• Bot device IP/FQDN</li><li>• Bot application credentials</li><li>• User application logs</li></ul>			

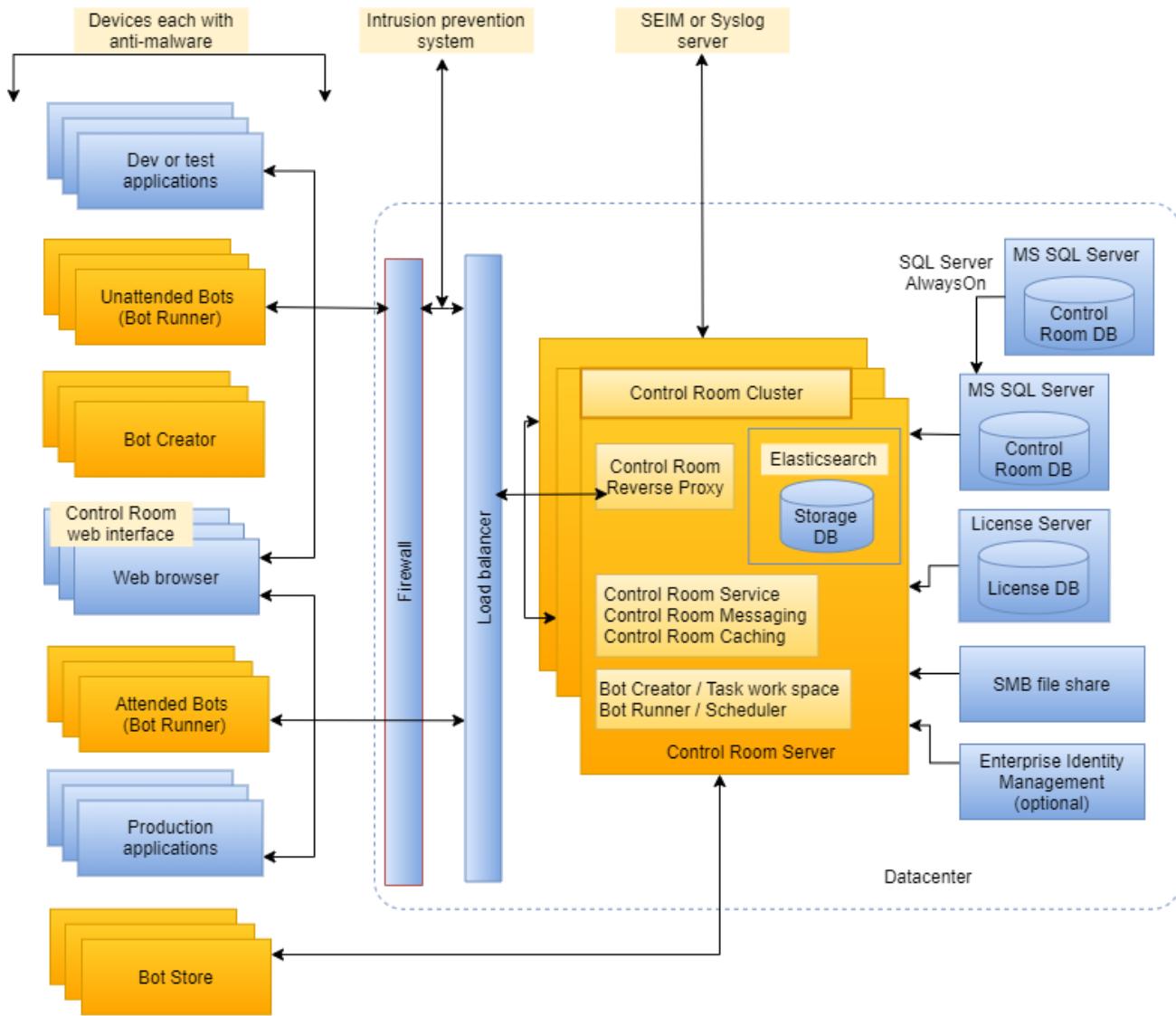
## Securing the RPA environment with external controls

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:

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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

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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.

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- [RBAC on bots](#)

- [RBAC on Bot Runners](#)

RBAC on Bot Runners facilitates complete isolation of one department Bot Runner seamlessly from the remaining departments' Bot Runners.

- [RBAC for Credential Vault credentials management](#)

Credentials created in the Enterprise Control Room are used across Bot Creators and Bot Runners.

- [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 on Audit Log](#)

Audit is automated for all privileged and nonprivileged roles to conform to best practices, as defined in NIST AC-6.

- [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.

- [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.

- [RBAC on roles and permissions management](#)

Access is deny all and allow by exception based on roles, domains as defined in RBAC.

- [RBAC on bot schedules](#)

Access is deny all and allow by exception based on roles and domains as defined in RBAC.

- [RBAC on license management](#)

Access to license management is deny all and allow by exception based on roles and domains as defined in RBAC.

## 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 managments 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](#)).

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## 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](#)

[Create locker](#)

### Related reference

[Credentials and lockers in the Credential Vault](#)

## 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.

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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.

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#### 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.

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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.

- [Credential storage](#)

All sensitive data is stored in the Credential Vault using AES-256 encryption.

- [Credential provisioning to bots](#)

Credentials are provisioned only during the execution of automation.

- [Cryptographic providers](#)

Use only the listed supported cryptographic providers.

### 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

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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

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## 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 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.

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## 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](#) automation data.

### [Dynamic access token authentication of Bot Runners](#)

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.

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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 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 (NI5T 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.

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## 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.](#)

- [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.

- [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.

- [Authentication for Bot Runners](#)

Two layers of authentication are present for deploying the bots on remote Bot Runners.

- [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.

## 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.

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## 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](#). 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
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

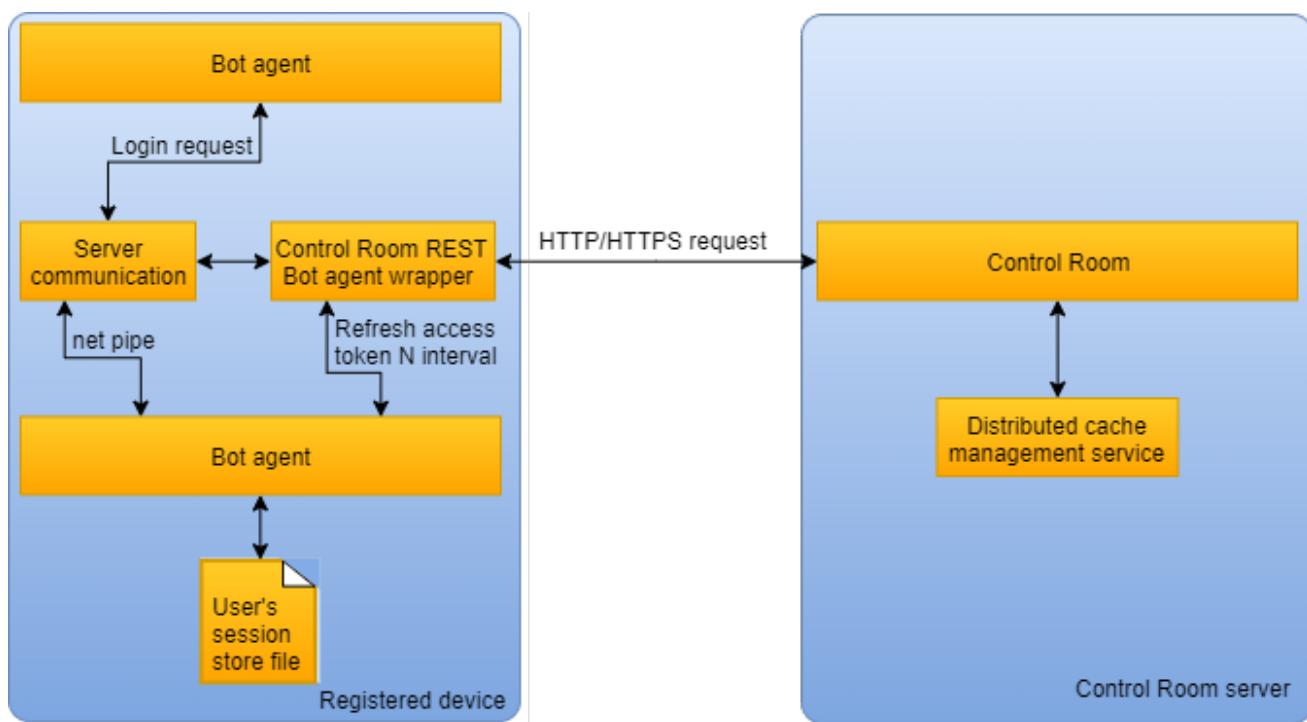
The Enterprise Control Room implements and enforces a Trusted Path for registration and authentication of Bot Creators and Bot Runners in accordance with NIST SC-11.

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

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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.

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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

### Secure software development life cycle (S-SDLC)

Automation Anywhere has implemented a development security plan and protocol that defines a specific depth of testing/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.

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## Veracode vulnerability scanning for static and dynamic code analysis

On 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

On each weekly build during the development process and before every release, all of the third-party libraries and dependencies in Automation Anywhere's 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.

## Penetration testing

Automation Anywhere does a penetration test via 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

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- 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

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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.

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## 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.

- [Connecting manually to an Enterprise Control Room](#)

Connect to a Enterprise Control Room from the Automation Anywhere Mobile application with a self-signed certificate.

## 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.

Automation Anywhere Version A2019 - 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).

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.

### Prerequisites

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:

### Procedure

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 upgrade Enterprise A2019

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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 \(Cloud deployed\) and Community Edition prerequisites](#):
  - a) If you are using Community Edition, [Register as a Community user](#).
  - b) Verify your device meets [Enterprise A2019 \(Cloud deployed\) and Community Edition device requirements](#).

On-Premises administrators, verify your datacenter meets [Enterprise A2019 On-Premises prerequisites](#).

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.

- b) Windows installation: [Enterprise A2019 On-Premises Enterprise Control Room installation](#)
  - c) Linux installation: [Installing Enterprise Control Room on Linux](#)
- d) 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 \(Cloud deployed\) and Community Edition device requirements](#), [Log in to Automation Anywhere Enterprise Control Room](#).
  - e) Create your bot users by assigning a role and device license: [Create user](#), [Create an Active Directory user](#).
  - f) 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 \(Cloud deployed\) and Community Edition device requirements](#), [Log in to Automation Anywhere Enterprise Control Room](#).

5. Register your device and install the Bot agent: [Install Bot agent and register device](#).

Note: The Bot agent is installed only on devices running the supported Windows operating systems. See [Enterprise A2019 \(Cloud deployed\) and Community Edition device requirements](#). However, you can still build bots using the Bot editor for creating bots.

6. Start creating bots: [Create your first bot](#) or [Build a Go be Great bot](#).

- [Getting started with Enterprise A2019 \(Cloud deployed\) and Community Edition](#)

Use these tasks to prepare for, and start creating and using bots with Automation Anywhere Enterprise A2019 (Cloud deployed) and Community Edition.

- [Install and upgrade IQ Bot A2019](#)

Perform these tasks to set up IQ Bot A2019 Community Edition, On-Premises, and Cloud deployed, and start using them with the same editions of Enterprise A2019.

- [Getting 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.

- [Enterprise A2019 On-Premises prerequisites](#)

Determine whether the system has the required hardware and software to install Enterprise Control Room for A2019 On-Premises.

- [Enterprise A2019 On-Premises Enterprise Control Room installation](#)

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.

- [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.

- [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.

- [Enterprise A2019 licenses](#)

The All Licenses page displays detailed information about current product and device licenses.

- [Upgrade to Enterprise A2019](#)

Upgrade to the latest Enterprise A2019 version from Versions 11.x, 10.x, or from earlier Enterprise A2019 versions.

#### Related tasks

[Log in to Automation Anywhere Enterprise Control Room](#)

[Register as a Community user](#)

#### Related reference

[Enterprise A2019 \(Cloud deployed\) and Community Edition device requirements](#)

[Supported browsers for Enterprise A2019](#)

# Getting started with Enterprise A2019 (Cloud deployed) and Community Edition

Use these tasks to prepare for, and start creating and using bots with Automation Anywhere Enterprise A2019 (Cloud deployed) and Community Edition.

The following is a workflow for creating and using bots in Enterprise A2019 or Community Edition:

## Prerequisites for [Enterprise A2019 \(Cloud deployed\) and Community Edition prerequisites](#)

Determine whether your device meets the required hardware and software requirements to register your device with Automation Anywhere Enterprise and create or run bots.

### 1. Receive your Enterprise Control Room URL and login credentials.

The URL points to your Automation Anywhere Enterprise instance.

- If you are an Automation Anywhere Enterprise Community Edition user, the login credentials are those you set when you registered.

See [Register as a Community Edition user](#) and complete the steps.

- 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.

### 2. 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.

### 3. Install Bot agent and register device and Set user 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.

To enable a device for running bots, set the local device credentials.

Watch the following video on how to install the Bot agent in Enterprise A2019:

Install the Bot agent

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.

Follow these steps to create your first bot that prints the message, Go be great!, the Automation Anywhere version of Hello World!

Watch the following video on how to build your first bot:

Build your first bot

### 5. Run your first bot.

Run a bot from the same device that you used to create the bot.

Watch the following video on how to run your first bot in the Community Edition:

Run your first bot

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Watch the following video for an introduction to Enterprise A2019:

### Introduction to Enterprise A2019

- [Enterprise A2019 \(Cloud deployed\) and Community Edition prerequisites](#)

Determine whether your device meets the required hardware and software requirements to register your device with Automation Anywhere Enterprise and create or run bots.

- [Register as a Community user](#)

Perform the steps to register yourself in the Automation Anywhere Enterprise Community Edition for using the Community Control Room to create and run bots.

- [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.

- [Introduction to 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. The Bot agent allows registered users with role-based access privileges to create, manage, and deploy bots.

- [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.

- [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!

- [Run your first bot](#)

Run a bot from the same device that you used to create the bot.

## Enterprise A2019 (Cloud deployed) and Community Edition prerequisites

Determine whether your device meets the required hardware and software requirements to register your device with Automation Anywhere Enterprise and create or run bots.

If your device meets the requirements, you then register your device with Automation Anywhere Enterprise, open a supported browser, log in to the Enterprise Control Room, and run your bot tasks. This includes creating and running bots.

- [Enterprise A2019 \(Cloud deployed\) and Community Edition device requirements](#)

Review the machine hardware specifications, operating system versions, and browser types supported by Automation Anywhere Enterprise for creating and running bots as an Enterprise A2019 (Cloud deployed) or Community Edition user on your local machine.

- [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.

- [Community capacity and limitations](#)

Community users access and bot creation and running conditions.

## Enterprise A2019 (Cloud deployed) and Community Edition device requirements

Review the machine hardware specifications, operating system versions, and browser types supported by Automation Anywhere Enterprise for creating and running bots as an Enterprise A2019 (Cloud deployed) or Community Edition user on your local machine.

### Hardware requirements for registered devices

You communicate with the Enterprise Control Room, through a registered local machine (device). 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.

For Enterprise Control Room operating system and platform compatibility, see [Enterprise Control Room operating system compatibility](#).

Device	Processor	RAM	Storage (free disk space)	Network
Machine	Intel Core i3 2.6 GHz 64-bit	<ul style="list-style-type: none"> <li>• 4 GB (Minimum)</li> <li>• 8 GB (Recommended)</li> </ul>	32 GB	<ul style="list-style-type: none"> <li>• 5Mbps (Minimum)</li> <li>• 20Mbps or higher (Recommended)</li> </ul>
Bot Creator and Bot Runner	No additions to the machine requirements	No additions to the machine requirements	Add 100 through 150 KB per Automation Anywhere script Add 40 through 50 GB per long-term project	No additions to the machine requirements

#### RAM on Cloud or Community Edition devices

Add additional RAM to account for applications and services running on the Automation Anywhere Enterprise machine, 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

#### Storage disk space on Cloud or Community Edition 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.

### On-Premises machines

Physical machines running any of the supported operating systems.

### Terminal servers

Using remote desktop (RDP) running any of the supported operating systems 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, 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.
- "Supported for single user" indicator in the following table means only one user can run a bot at any one time.
- 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 for single user	Supported for single user <sup>1</sup>	Supported for single user
Windows Server 2016	Datacenter	Supported for single user	Supported for single user <sup>1</sup>	Supported for single user
Windows Server 2012	Standard	Supported for single user	Supported for single user <sup>1</sup>	Supported for single user
Windows 10	Professional and Enterprise	Supported	Supported <sup>1</sup>	Supported

Windows version	Windows edition	Attended Bot Runner	Unattended Bot Runner	Bot Creator
Windows 8 <sup>2</sup>	Professional and Enterprise	Supported	Supported	Supported
Windows 7 <sup>2</sup>	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

(\*) 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 troubleshooting](#).

### 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	<code>www.automationanywhere.com</code>	TCP 443 (HTTPS)
Automation Anywhere Cloud Customer Tenant	<code>crdomainname-X.my.automationanywhere.digital</code>	TCP 443 (HTTPS)

Service	DNS	Port
This includes Automation Anywhere Enterprise Control Room and IQ Bot	Note that crdomainname-X refers to your specific tenant name	
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.	<ul style="list-style-type: none"> <li>• cdn.whatfix.com</li> <li>• cdn.heapanalytics.com</li> <li>• heapanalytics.com</li> </ul>	TCP 443 (HTTPS)

Related reference

[Ports, protocols, and firewall requirements](#)

## 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 in one Cloud Control Room at a time.

Number of bots created by Community Edition user

Each Community Edition user can create multiple bots.

Number of bots run by Community Edition user

Each Community Edition user can run one bot at a time on any one registered device.

Number of registered devices per Community Edition user

Each Community Edition user can register multiple devices, but only be logged into one at a time, and only run a bot on one device at a time.

## Register as a Community user

Perform the steps to register yourself in the Automation Anywhere Enterprise Community Edition for using the Community Control Room to create and run bots.

## Procedure

1. 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.
2. 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. All other special characters are not supported.

3. Read and agree to the terms, privacy policy, and license agreement. Select and click Submit.

## Next steps

Await the email from Automation Anywhere that contains the information for you to login to Automation Anywhere Enterprise Community Edition. This includes: Community Control Room URL, your username and assigned user password. After you login, 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.

## 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.

## Prerequisites

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 [Register as a Community user](#).
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.

## Procedure

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 you 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 type 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](#)

[Install Bot agent and register device](#)

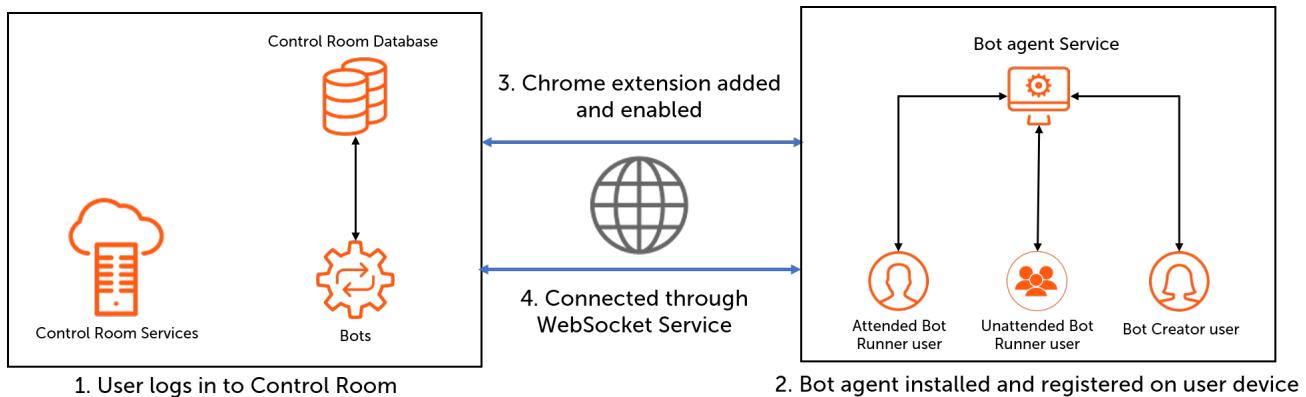
[Reset user password](#)

## Introduction to 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. The Bot agent allows registered users with role-based access privileges to create, manage, and deploy bots.

## 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. The user can then use other supported browsers 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.
- [Working with the Bot agent](#)  
Users can perform tasks based on their access privileges after installing the Bot agent on their device.

## 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

2. Install the Bot agent on your device.

### Install Bot agent and register device

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](#) | [Connect Bot agent to a device with a proxy using a script](#)

3. Set device credentials to enable the Enterprise Control Room to deploy bots on your device.

### Set user device credentials

4. Switch to a different Enterprise Control Room based on your automation requirements.

### Switch Bot agent to a different Enterprise Control Room

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](#) | [Manually update the Bot agent](#)

## Related tasks

Users can also perform the following tasks:

- Use the Bot agent relevant logs to resolve issues.

### Bot agent log files

- View the Bot agent performance data for analysis.

### Bot agent status processing

- Create and edit TaskBots

### Create your first bot | Editing bots

- Deploy bots on attended and unattended Bot Runners with or without Workload automation.

### Run a bot | Schedule a bot | Run bot with queue

- Manage different bots and packages using Bot Store, Bot Insight, and IQ Bot.

### Bot Store | Using Bot Insight | Getting started with IQ Bot

- Perform other activities such as updating user profile.

### Edit profile

Resources: For additional information about the Bot agent, see this training course: [RPA Certification Online Courses \(A-People login required\)](#)

## 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.

### Prerequisites

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.

### Procedure

1. Log in to the Enterprise Control Room through your Automation Anywhere Enterprise URL.
2. Navigate to MY DEVICES.
3. To add a local device, click Add local bot agent from the actions menu (vertical ellipsis) at the top-right.
4. Click Connect to my computer.
5. 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.

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:

Install the Bot agent

## Next steps

[Set user device credentials](#). Optionally, [Edit profile](#).

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](#)
- [Connect Bot agent to a device with a proxy using a script](#)

- [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 required for updating the Bot agent installed on user devices.

- [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.

- [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.

- [Set user device credentials](#)

To enable a device for running bots, set the local device credentials.

- [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.

- [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.

Related concepts

[About device pools](#)

Related tasks

[Create device pools](#)

## 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 required for updating the Bot agent installed on user devices.

The option defaults to auto-update based on the Enterprise A2019 deployment you use.

- For Enterprise A2019 Cloud and Community Edition, auto-update is enabled by default.
- For On-Premises, the default update option is set to manual.

The Enterprise Control Room administrator has the flexibility to push major updates to the Bot agent software when updates are available. The downtime is also reduced significantly because each user is not required to log in to the Enterprise Control Room to update the Bot agent installed on the user device.

## Procedure

1. Navigate to Administration > Devices.
2. In Bot-agent software, click Edit.
3. Select one of these options:

Option	Description
Automatically update all bot agents	<p>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.</p> <p>During the update, new deployments to that device are queued.</p>
Manually update bot agents	<p>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.</p> <p>Note: Each user has to log in to the Enterprise Control Room to update the Bot agent installed on the user's device.</p>

4. Click Save changes.

### Related tasks

[Manually update the Bot agent](#)

## 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.

## Procedure

1. Log in to the Enterprise Control Room through your Automation Anywhere Enterprise URL.
2. 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.

3. From the device icon, click Add local bot agent.
4. Click Connect to my computer.
5. Click the Manually download the latest version link.  
This option appears only if you have an existing Bot agent installed.
6. 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:

Video showing how to update the Bot agent

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](#)

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.

## Prerequisites

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.

## Procedure

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:

Update the Bot agent

Related tasks

[Install Bot agent and register device](#)

## Set user device credentials

To enable a device for running bots, set the local device credentials.

## Prerequisites

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](#).

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.

## Procedure

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.

3. Click Update.

## Next steps

[Create your first bot](#)

## 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 need to manually add or update the authenticating proxy credentials complete the following steps.

## Procedure

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 do these steps before or after installing the Bot agent.

## Procedure

To add or update the proxy do 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
```

A new command prompt window opens.

6. In the new window, execute the following command:

```
whoami
```

The system returns the following:

```
nt authority\system
```

7. Execute the following command:

```
inetcpl.cpl
```

- The Internet Properties window opens.
8. 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.

## 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!

### Prerequisites

Log in to your instance of the Automation Anywhere Enterprise Community Control Room or Cloud Control Room.

These steps describe the guided workflow for first time users. The guided workflow is only displayed the very first time you complete these steps.

### Procedure

1. Open a new bot:
  - a) From the Automation Anywhere 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 (%).

0. Insert a [Message box package](#) 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.
1. 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.
- d) Click the Apply button to save your message edits.

The Message Box action is added to the flowchart in the Bot editor.

## 2. Click Save.

Your bot is now ready to run.

## Next steps

### 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.
- Dual: Split screen of the Flow and List views.

### 2. Run your bot from your Automation Anywhere Enterprise device. See [Run your first bot](#).

## Run your first bot

Run a bot from the same device that you used to create the bot.

## Prerequisites

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](#)
- [2. Set user device credentials](#)
- [3. Create your first bot](#)

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.

## Procedure

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:

[Run your first bot](#)

## Next steps

Build bots using variables, actions, and the Universal Recorder. See [Get started building bots](#).

## Install and upgrade IQ Bot A2019

Perform these tasks to set up IQ Bot A2019 Community Edition, On-Premises, and Cloud deployed, and start using them with the same editions of Enterprise A2019.

- Install or set up IQ Bot A2019: If you are new to IQ Bot A2019, go to Automation Anywhere support site to download and install the latest version of IQ Bot A2019:

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

- Upgrade to IQ Bot A2019: If you are using an earlier version of IQ Bot, upgrade to IQ Bot A2019. Uninstall the earlier version of IQ Bot and then install the latest version of IQ Bot A2019. See the available upgrade options to choose the appropriate option for your requirements.

[Upgrading IQ Bot A2019](#)

- 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.

To understand how the IQ Bot features work, see: [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 [Register as a Community user](#).

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: Build an IQ BotCommunity Edition learning instance

## 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](#)

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.

4. 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.

- [IQ Bot system requirements](#)

Review the operating system and database compatibility, database information, and the hardware and software requirements for IQ Bot A2019.

- [Upgrading IQ Bot A2019](#)

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

- [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.

Related concepts

[Getting started with Enterprise A2019 \(Cloud deployed\) and Community Edition](#)

## IQ Bot system requirements

Review the operating system and database compatibility, database information, and the hardware and software requirements for IQ Bot A2019.

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: <ul style="list-style-type: none"><li>• 2019 Data Center</li><li>• 2016 Data Center</li><li>• 2016 R2 Standard</li><li>• 2019 R2 Standard</li></ul>	Microsoft Azure Virtual Machines	<ul style="list-style-type: none"><li>• Microsoft SQL Azure (RTM)</li><li>• Amazon Relational Database Service (Amazon RDS)</li><li>• Microsoft SQL Server</li></ul>	<ul style="list-style-type: none"><li>• 2019</li><li>• 2017</li><li>• 2016</li><li>• 2014</li><li>• 2012</li></ul>	<ul style="list-style-type: none"><li>• Express</li><li>• Standard</li></ul>

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

Microsoft SQL Server and Amazon RDS databases	
Required information	Description
Database port	Default: 1433
Service credentials	<p>Provides the user with the following permissions:</p> <ul style="list-style-type: none"> <li>• CONNECT SQL</li> <li>• CREATE ANY DATABASE</li> <li>• VIEW ANY DATABASE</li> </ul>

## Hardware requirements

IQ Bot	Recommendation
Application server optimum requirements	<ul style="list-style-type: none"> <li>• 32 GB RAM (at least 16 GB RAM)</li> <li>• 8 Octa Core Processor</li> <li>• 500 GB hard disk space</li> <li>• Ensure drive C has 100 GB plus free hard disk space</li> </ul>

## Software requirements

Software	Details
Database Management System	<a href="#">IQ Bot A2019 feature comparison matrix</a>
Automation Anywhere Enterprise Control Room	<a href="#">IQ Bot A2019 version compatibility</a>
Web browsers	<p>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.</p>
Dependencies	<p>Automation Anywhere Enterprise requires the following software, which is automatically installed during the installation:</p> <ul style="list-style-type: none"> <li>• Microsoft .NET Framework v4.7.2  The system prompts for a restart to complete the update.</li> <li>• Erlang v22.0</li> <li>• RabbitMQ v3.7.17</li> <li>• NodeJS v10.16.3</li> <li>• Microsoft SQL Server 2012 Native Client- QFE</li> </ul>

Software	Details
	<ul style="list-style-type: none"> <li>• Python 3.5.4 (32 bit)</li> </ul> <p>Note: In a cluster environment, all dependencies will be installed on each machine where IQ Bot is installed.</p>

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.

## Upgrading IQ Bot A2019

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

### Prerequisites

Before you start the upgrade, ensure all the IQ Bot learning instances are backed up. If you are upgrading to IQ Bot Cloud, ensure you install the latest version of IQ Bot A2019 On-Premises.

Upgrade options:

- Upgrade from builds 1089, 1598, and 2079 to the latest version of IQ Bot A2019.

#### [Run IQ Bot On-Premises database migration script](#)

- Upgrade from newer builds to the latest version of IQ Bot A2019.

#### [Upgrade IQ Bot A2019 to the latest version](#)

- [Upgrade earlier IQ Bot versions to IQ Bot A2019 On-Premises](#)

Upgrade from an earlier IQ Bot version (from 6.x through 11.x) to IQ Bot A2019 (On-Premises) for the latest features and enhancements.

- [Upgrade 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.

- [Upgrade IQ Bot A2019 to the latest version](#)

If you are using any of the earlier versions of IQ Bot A2019, you can upgrade to the latest version.

### Upgrade earlier IQ Bot versions to IQ Bot A2019 On-Premises

Upgrade from an earlier IQ Bot version (from 6.x through 11.x) to IQ Bot A2019 (On-Premises) for the latest features and enhancements.

## Prerequisites

1. If you are currently using any of the earlier versions of Automation Anywhere Enterprise (10.x or 11.x), ensure you upgrade to the latest Enterprise A2019 version.

### [Upgrade to Enterprise A2019](#)

2. Ensure the Enterprise A2019 version corresponds to the IQ Bot A2019 that you are installing.

### [IQ Bot A2019 version compatibility](#)

3. Upgrade to the latest IQ Bot A2019 from IQ Bot Version 11.3.3.1 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) Upgrade to IQ Bot Version 6.5.

See [Upgrade IQ Bot from 5.3.x or 6.0 to 6.5](#)

- b) Upgrade IQ Bot Version 6.5 to IQ Bot Version 11.3.3.1 before upgrading to IQ Bot A2019.

### [Upgrade IQ Bot from 6.5.x and earlier versions to 11.3.3.x](#)

4. Ensure you back up your existing IQ Bot databases.

In the earlier IQ Bot versions, five databases were created. With IQ Bot A2019, a single unified database is created. So perform this backup before upgrading to IQ Bot A2019.

Use the A2019 Database Migration Assistant to migrate data from IQ Bot Version 11.3.3.1 or later databases to the IQ Bot A2019 unified database.

## Procedure

1. Uninstall any earlier IQ Bot versions.

Note: Uninstalling an existing IQ Bot build does not delete the database.

2. Uninstall existing RabbitMQ and Erlang/OTP from the Control Panel.

3. Run the Cleanup\_Components.bat file as an administrator.

4. Restart your machine.

5. Log in to Automation Anywhere support site and download the Database Migration Assistant: [A-People Downloads page \(Login required\)](#).

6. Double-click the file to start the installation.

7. Click Next to continue, accept the license agreement, and click Next.

8. In the Database Configuration screen, enter your existing IQ Bot database host name and credentials, and click Next.

9. Optional: Click Browse to change the default installation folder for the Database Migration Assistant.

10. 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.

11. Log in to the Automation Anywhere support site to download and install the latest IQ Bot A2019 build:

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

12. 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.

- 
13. 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.

## Upgrade 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.

### Prerequisites

You must install the latest version of IQ Bot A2019 On-Premises before you upgrade to IQ Bot Cloud. See [Upgrade earlier IQ Bot versions to IQ Bot A2019 On-Premises](#).

Users have the following options to upload the .iqba file to IQ Bot Cloud:

- Use Migration Utility > Export/Import from the UI. This is available from A2019.15.

#### [Migrate learning instances](#)

- 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 \(A-People login required\)](#)

### Procedure

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 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.

## Upgrade IQ Bot A2019 to the latest version

If you are using any of the earlier versions of IQ Bot A2019, you can upgrade to the latest version.

## Prerequisites

Latest version of IQ Bot A2019 offers enhancements and bug fixes. It is recommended that you review your existing IQ Bot A2019 version and back up your database, output path, and installation configuration files.

Uninstall the existing version of IQ Bot A2019 from your machine before updating to the latest version.

## Procedure

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 installation file upgrades the existing IQ Bot A2019 installed on your device.

## 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.

## Prerequisites

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.

## Procedure

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 Binns.  
`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.

## Getting 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](#)

Follow steps to install or upgrade IQ Bot A2019:

- [Install and upgrade IQ Bot A2019](#)
- [Upgrading IQ Bot A2019](#)

## 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](#)

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](#)

7. Unclassified and invalid documents are moved to a separate folder for manual validation.

#### [IQ Bot Validator](#)

- [Migrate learning instances](#)

Use the IQ Bot A2019 Migration Utility feature to export and import learning between environments to avoid recreating similar learning instances and easily manage the lifecycle of a learning instance and associated bots.

## Migrate learning instances

Use the IQ Bot A2019 Migration Utility feature to export and import learning between environments to avoid recreating similar learning instances and easily manage the lifecycle of a learning instance and associated bots.

## Prerequisites

This operation requires the IQ Bot Admin role or a custom role with migration permissions.

## Procedure

To migrate learning instances from one environment to another, follow these steps:

1. 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.
  - d) Click Backup.

An archive (.iqba) file is created, which can be downloaded and exported to the target environment.
2. Download the .iqba file to move it to the destination environment. Click the download icon next to the backup entry in the list.
3. 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.
4. Restore the uploaded backup file in the destination environment. Click the restore icon next to the backup entry in the list.

- **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.

### 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](#)

## 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](#)

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.

#### [Enterprise Control Room operating system compatibility](#)

The Enterprise Control Room is installed on machines with supported operating systems.

#### [Bot agent compatibility](#)

Bot agent is the Automation Anywhere Enterprise plug-in that allows you to create and run bots. Bot agent is installed on devices used to access the Enterprise Control Room. Installing the Bot agent is part of registering a device.

#### [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.

## Data center requirements

### [Database requirements](#)

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](#)

Configure Microsoft SQL Servers before setting up the Enterprise Control Room database.

### [Working with Azure SQL PaaS](#)

Using PaaS SQL database with Azure requires configuration from the Azure instance.

### [Load balancer requirements](#)

View the load balancer requirements for Automation Anywhere installation. This includes load balancer minimums, and both TCP and HTTPS layer load balancing requirements.

### [Ports, protocols, and firewall requirements](#)

View the default and configurable firewall, port, and protocol requirements for Automation Anywhere deployment.

### [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.

### [HA and single-node deployments](#)

Identify your key requirements before selecting a deployment model. Automation Anywhere Enterprise offers multiple deployment options to meet various levels of enterprise cost/price performance and resiliency needs. This includes installation on single-nodes, and Highly Available (HA) clusters.

#### [High availability deployment model](#)

The High availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases.

#### [Single-node deployment](#)

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](#)
- [Installing Enterprise Control Room on Amazon Web Services](#)
- [Installing Enterprise Control Room using Custom mode](#)

### Related tasks

- [Installing Enterprise Control Room using Express mode](#)
- [Installing Enterprise Control Room using scripts](#)

## 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](#)

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](#)

Use of the concept Quality of Service (QoS) applies to availability of the Enterprise Control Room.

### [Bot agent status processing](#)

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 Automation Anywhere Enterprise can support. Deploying additional Enterprise Control Room or machine resources does not affect the entity count.

Entity Types and Counts	
Entity Type	Count
Users	5000
Roles	2000
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
Two 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.

Table 1. Concurrent schedule timing estimates

Activity	Schedule data
Concurrent schedules	100
Run as user per schedule	10
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

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	<ul style="list-style-type: none"> <li>• 2019</li> <li>• 2017</li> <li>• 2016</li> <li>• 2014 SP1</li> </ul>	<ul style="list-style-type: none"> <li>• Enterprise</li> <li>• Express</li> <li>• Standard</li> </ul>	<ul style="list-style-type: none"> <li>• Windows Server 2008 R2 Standard or later</li> <li>• Linux CentOS 7.7</li> <li>• Red Hat Enterprise Linux 7.7</li> </ul> <p>Note: All database versions are supported for all OS.</p>	Amazon Web Services Relational Database Service (RDS)	<p>Installed and configured.</p> <p>Only option for Express installations.</p> <p>Enable protocols for Named Pipes and TCP/IP.</p>

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	<p>Provide credentials for a Microsoft SQL Server user who has permission to connect to the database.</p> <p>Use only supported characters for the authentication user name and password. See <a href="#">Supported special characters</a>. Do not use semicolons ( ; ) in the database password.</p>
	<p>Linux example:</p> <p>SQL Database server Login ID: sa</p>

Microsoft SQL Server database	
Required information	Description
	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](#)

[Installing Enterprise Control Room on Microsoft Azure](#)

#### Related tasks

[Installing Enterprise Control Room on Linux](#)

[Configure default database port](#)

#### Related reference

[Ports, protocols, and firewall requirements](#)

## 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 IPA11 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](#) for a list of supported Microsoft SQL Server versions.

Service Credentials	Windows Authentication	SQL Authentication
Local System Account	<ul style="list-style-type: none"> <li>• Current logged in user account is used to create:           <ul style="list-style-type: none"> <li>• Database</li> <li>• Tables</li> </ul> </li> <li>• Installer gives db_owner permission to NT AUTHORITY\SYSTEM account.</li> </ul>	<p>SQL User account is used to create:</p> <ul style="list-style-type: none"> <li>• Databases</li> <li>• Tables</li> </ul>
Domain User Account	<ul style="list-style-type: none"> <li>• Current logged in user account is used to create database.</li> <li>• Domain user account is used to create tables.</li> <li>• Installer gives db_owner permission to domain user account.</li> </ul>	<p>SQL User account is used to create:</p> <ul style="list-style-type: none"> <li>• Databases</li> <li>• Tables</li> </ul>
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](#)

## 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.

## Procedure

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.

## Next steps

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](#).

## Enterprise Control Room operating system compatibility

The Enterprise Control Room is installed on machines with supported operating systems.

## 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.

### [Bot agent compatibility](#)

Enterprise A2019 supports 64-bit version of the Microsoft operating system.

Recommendation: Enable Desktop Experience when using the server or client operating system.

Operating system	Environment	Deployment type with version/build
Microsoft Windows Server 2012 and 2012 R2 Datacenter	Amazon Web Services Elastic Compute Cloud (EC2)	<ul style="list-style-type: none"> <li>• A2019.12 On-Premises Build 4105 or later</li> <li>• A2019.12 Cloud Build 4111 or later</li> </ul>
	Microsoft Azure VM	<ul style="list-style-type: none"> <li>• A2019.12 On-Premises Build 4105 or later</li> </ul>

Operating system	Environment	Deployment type with version/build
Microsoft Windows Server 2016 Standard and Datacenter		<ul style="list-style-type: none"> <li>• A2019.12 Cloud Build 4111 or later</li> </ul>
	Microsoft Windows Server	<ul style="list-style-type: none"> <li>• A2019.12 On-Premises Build 4105 or later</li> <li>• A2019.12 Cloud Build 4111 or later</li> </ul>
Microsoft Windows Server 2019 Standard and Datacenter	Microsoft Azure VM	<ul style="list-style-type: none"> <li>• On-Premises Build 2079 or later</li> <li>• Cloud Build 2079 or later</li> </ul>
	Microsoft Windows Server	<ul style="list-style-type: none"> <li>• On-Premises Build 1089 or later</li> <li>• Cloud Build 1082 or later</li> </ul>
• Linux CentOS 7.7 • Red Hat Enterprise Linux 7.7	Amazon Web Services Elastic Compute Cloud (EC2)	<ul style="list-style-type: none"> <li>• On-Premises Build 1089 or later</li> <li>• Cloud Build 1082 or later</li> </ul>
	Microsoft Azure VM	<ul style="list-style-type: none"> <li>• On-Premises Build 2079 or later</li> <li>• Cloud Build 2079 or later</li> </ul>
	Microsoft Windows Server	<ul style="list-style-type: none"> <li>• On-Premises Build 1089 or later</li> <li>• Cloud Build 1082 or later</li> </ul>
	Amazon Web Services Elastic Compute Cloud (EC2)	<ul style="list-style-type: none"> <li>• On-Premises Build 2545 or later</li> <li>• Cloud Build 2545 or later</li> </ul>
	Microsoft Windows Server	<ul style="list-style-type: none"> <li>• On-Premises Build 2545 or later</li> <li>• Cloud Build 2545 or later</li> </ul>

Related reference

[Bot agent compatibility](#)[Enterprise Control Room server requirements](#)

## Bot agent compatibility

Bot agent is the Automation Anywhere Enterprise plug-in that allows you to create and run bots. Bot agent is installed on devices used to access the Enterprise Control Room. Installing the Bot agent is part of registering a device.

## Bot agent hardware requirements

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 64-bit	<ul style="list-style-type: none"> <li>• 4 GB (Minimum)</li> <li>• 8 GB (Recommended)</li> </ul>	32 GB	<ul style="list-style-type: none"> <li>• 5Mbps (Minimum)</li> <li>• 20Mbps or higher (Recommended)</li> </ul>
Bot Creator and Bot Runner	No additions to the machine requirements	No additions to the machine requirements	Add 100 through 150 KB per Automation Anywhere script Add 40 through 50 GB per long-term project	No additions to the machine requirements

### RAM on Cloud or Community Edition devices

Add additional RAM to account for applications and services running on the Automation Anywhere Enterprise machine, 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

### Storage disk space on Cloud or Community Edition 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.

## Bot agent platform compatibility

A device running the Bot agent to perform bot tasks must meet the platform requirements.

Note: Platform requirements are different for the Enterprise Control Room and Bot agent.

### 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 (Windows 2012, Windows 2016, and Windows 2019), Microsoft Azure (Windows 10 Pro), VMware VMs (ESXi 6.7), and Oracle Virtual Box (version 6.1).

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.

## Bot agent operating system compatibility

The Automation Anywhere Enterprise Bot agent can be installed on machines running the following operating systems.

This applies to On-Premises, Cloud deployments, and Community Edition of Enterprise A2019.

Note:

- Only 64-bit operating system version supported.
- "Supported for single user" indicator in the following table means only one user can run a bot at any one time.
- 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 for single user	Supported for single user <sup>1</sup>	Supported for single user
Windows Server 2016	Datacenter	Supported for single user	Supported for single user <sup>1</sup>	Supported for single user

Windows version	Windows edition	Attended Bot Runner	Unattended Bot Runner	Bot Creator
Windows Server 2012	Standard	Supported for single user	Supported for single user <sup>1</sup>	Supported for single user
Windows 10	Professional and Enterprise	Supported	Supported <sup>1</sup>	Supported
Windows 8 <sup>2</sup>	Professional and Enterprise	Supported	Supported	Supported
Windows 7 <sup>2</sup>	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.

## 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
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 and	Not certified	Not certified

SID#	Scenario	Windows 2019	Windows 2016 R2	Windows 2012 R2	Windows 10	Windows 8	Windows 7
					virtual machines only		
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 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 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.

## Bot agent browser compatibility

The user interface for Automation Anywhere Enterprise is 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

(\*) 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 troubleshooting](#).

Related reference

[Enterprise A2019 feature comparison matrix](#)

## 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: <ul style="list-style-type: none"><li>• Windows - <code>system administrator</code></li><li>• Linux - superuser <code>sudo, root</code></li></ul>
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:  <code>C:\ProgramData</code>  <code>C:\Windows\System32\config\systemprofile</code>

Access point	Task	Type
		C:\Users\<loggedInUser>\AppData\Local\AutomationAnywhere
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.

Access point	Task	Type
		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 minimums, and both TCP and HTTPS layer load balancing requirements.

### Load Balancer Minimum Requirements

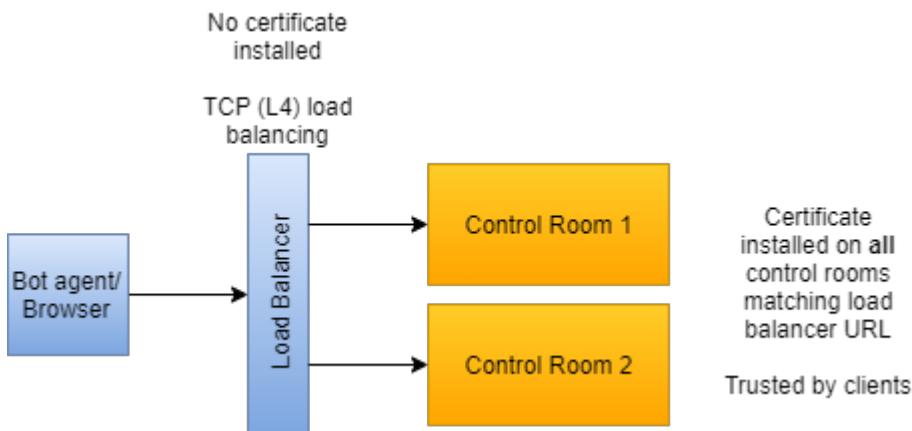
For best practice with Automation Anywhere, ensure the load balancer:

- (Required) Supports WebSocket protocol (RFC 6455)
- (Preferred) Has idle timeout set to 120 seconds
- (Preferred) Uses round-robin host selection. 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`.

### 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

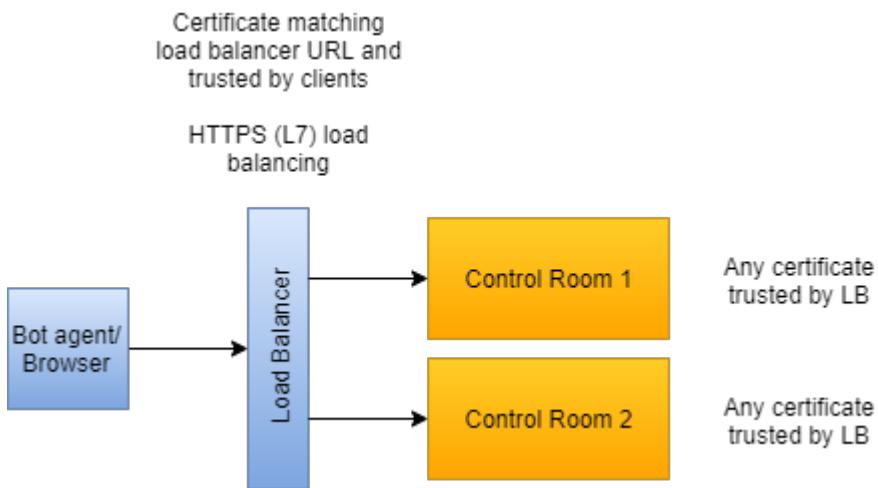
- End-to-end encryption without the possibility of intercept at the load balancer.
- Single certificate required.

#### 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](#)

Refer to the following tables for lists of required ports and their use.

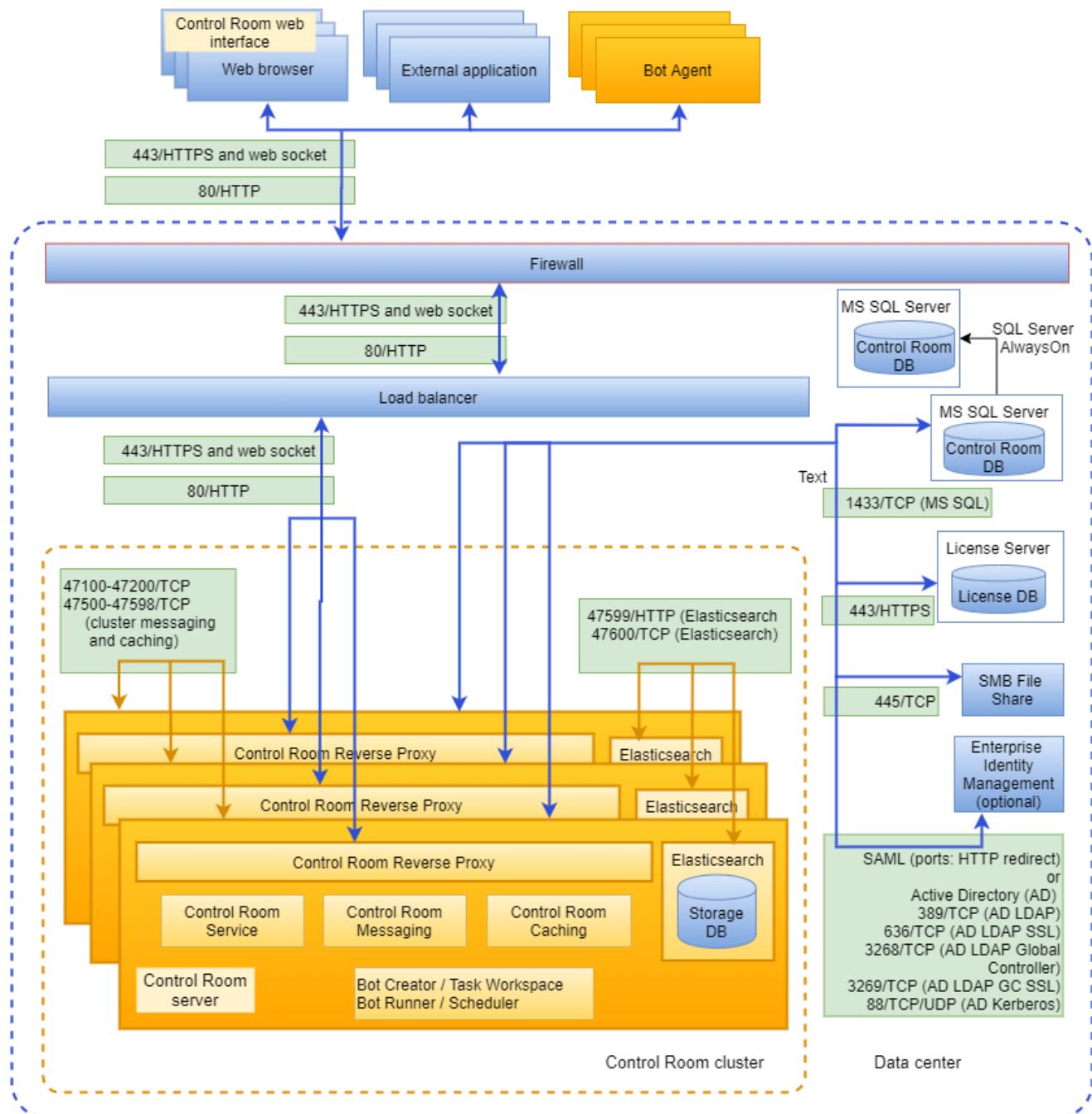
## Enterprise Control Room

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 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	HTTPS and web socket	
	80	HTTP	
Firewall	443	HTTPS and web socket	
	80	HTTP	
Enterprise identity management  Example: Active Directory ports	389	TCP (LDAP)	
	636	TCP (LDAP SSL)	
	3268	TCP (LDAP Global controller)	
	3269	TCP (LDAP Global controller SSL)	
	88	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	<ul style="list-style-type: none"> <li>Microsoft Windows Server 2012 and 2012 R2 Datacenter</li> <li>Microsoft Windows Server 2016 Standard and Datacenter</li> <li>Microsoft Windows Server 2019 Standard and Datacenter</li> </ul>	IaaS
Identity management: <a href="#">Azure Active Directory</a>	Azure Active Directory	<ul style="list-style-type: none"> <li>IDaaS</li> <li>Windows 2016 for IaaS</li> </ul>
<a href="#">SMB File Share</a>	Azure File Share	PaaS
<a href="#">Load Balancer</a>	Azure Load Balancer (Not Application Gateway)	PaaS

Data center object	Supported version	Configuration
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
Azure Active Directory	53, 389	Any
LDAP	3268, 3269	Any
email SMTP	587	Any
SSH	22	Any
RDP	3389	TCP

### Related tasks

[Prepare for installation on Amazon Web Services](#)

[Verify readiness for installation on Microsoft Azure](#)

### Related reference

[Enterprise A2019 On-Premises prerequisites](#)

[Adding Automation Anywhere DNS to safe recipients 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

(\*) 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 troubleshooting](#).

## 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
Cloud Build 1082 On-Premises Build 1089 Bot agent 1.0.1	All bot tasks	All bot tasks, except Credential Vault

## Google Chrome troubleshooting

Ensure the Automation Anywhere Google Chrome extension you are using is appropriate for your Enterprise A2019 installation.

## Prerequisites

Check if the browser agent is running. Open the Windows Task Manager and scan for the browser agent that corresponds with the Recorder package version used in your bots (see table below).

- If the browser agent is running with the Google Chrome extension that corresponds with the Recorder package version, no additional steps are required.
- If the browser agent 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.

Automation Anywhere has created different versions of the Google Chrome extension, based on the Recorder package version. Review the following table to verify that your system is running the correct browser agent and Google Chrome extension.

Recorder package version	Browser agent	Google Chrome extension and ID <sup>2</sup>
2.0.5 or earlier	Automation.BrowserAgent.exe	<a href="#">Chrome web store</a> Version: 11 or 12 ID: jjpdebaihkangkfpbgefnnlafkahebn
2.0.6 or later	Automation.Bot.BrowserAgent.exe	<a href="#">A2019 Chrome web store</a> Version: 1.0.0.3 or later ID: kammdlphdfejlopponbapgpbgakimokm

#### (1) Google Chrome re-verification

CAUTION: 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.

#### (2) Google Chrome extension

Automation Anywhere A2019 extension version 1.0.0.3 is the recommended Google Chrome extension for bots that contain actions from the Recorder package 2.0.6 and later. The earlier Google Chrome extension is required only to run bots that contain actions from the Recorder package 2.0.5 and earlier.

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.

## Procedure

To install or update the Google Chrome extension, choose the scenario that applies to you and follow the steps.

- If you are using Recorder package version 2.0.6 or later:
  1. Verify that Google Chrome extension version 1.0.0.3 is installed and enabled.
  2. Check the Windows registry for Google Chrome: 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
- 4. If the registry points to Recorder package version 2.0.6 or later, disable and reenable the extension.
  - If you are using Recorder package version 2.0.5 or earlier, and have never installed Automation Anywhere Enterprise Version 11.3 or later:
    1. Verify that Google Chrome extension version 11 or 12 is installed and enabled.
    2. Check the Windows registry for Google Chrome:  
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.
  - If you have installed Automation Anywhere Enterprise Version 11.3.3 or later and Enterprise A2019 simultaneously:
    1. Check for the following Windows registry key: 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.
    3. Ensure that the Bot agent Automation.BrowserAgent.exe is running with the Google Chrome extension installed and enabled.
  - If you uninstalled Automation Anywhere Enterprise Version 11.3:
    1. Disable Google Chrome extension 12.x.
    2. Install and enable Google Chrome extension 11.x.
    3. Open the registry on the Windows system for editing.
    4. Remove: Computer\HKEY\_CURRENT\_USER\Software\Google\Chrome\NativeMessagingHosts\automation.chrome.agent
    5. Check the Windows registry for Google Chrome: Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\WOW6432Node\Google\Chrome\NativeMessagingHosts\automation.chrome.agent
    6. Verify that the registry entry points to the Enterprise A2019 global cache.
    7. Restart Google Chrome.
  - 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 jjpdebaihkangkfpbgefnnlafkahebn, 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 AAChromeAgentManifest.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:

- c) Computer\HKEY\_LOCAL\_MACHINE\Software\Google\Chrome\Extensions(ExtensionID)
- d) Computer\HKEY\_CURRENT\_USER\Software\Google\Chrome\Extensions(ExtensionID)
- e) Restart Google Chrome.

## 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

## 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
French	Available	Available	Available
German	Available	Available	Available
Italian	Available	Available	Not available

Language	Internationalization (operating system and character set)	Localization (user interface)	Product documentation
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.
Microsoft Internet Information Services (IIS) web server, version 8 or later.	Lightweight Directory Access Protocol (LDAP) and Kerberos supported.
Microsoft OLEDB Driver for Microsoft SQL Server	For Express Enterprise Control Room installations.

Dependency	Supported Enterprise Control Room option
Microsoft Visual C++ Redistributable for Visual Studio, version 2013 or later	For Express Enterprise Control Room installations.
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 1

On new machines, physical or virtual, install Microsoft .NET Framework before you install Microsoft Office. This ensures required Primary Interop Assemblies (PIA) re-distributables 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.
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.

Dependency	Automation Anywhere Plug-in	Supported Bot action
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: <ul style="list-style-type: none"><li>• TN3270</li><li>• TN5250</li></ul>		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

Character	Windows authentication	Enterprise Control Room authentication	Database name, username, or password	JSON Web Token authentication
parenthesis, left or right ( )	Supported	--	--	--
percent ( % )	Supported	Supported	Do not use	Supported
period ( . )	Supported	Supported	Supported	Supported
pipe (   )	Do not use	--	--	--
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](#)

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](#)

[Using Citrix XenDesktop on Cloud](#)

[Installing the Citrix required components on local machines](#)

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#)

## 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.

## Prerequisites

Complete the steps listed in the following tasks:

- [Installing the Citrix required components on local machines](#)
- [Installing Automation Anywhere remote agent for Citrix on Citrix servers](#)

Create bots with applications running on a remote Citrix Virtual Apps server using the Automation Anywhere remote agent for Citrix.

## Procedure

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](#)

### Related tasks

[Installing the Citrix required components on local machines](#)

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#)

[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.

## Procedure

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](#)

Related tasks

[Using the Recorder on Citrix Virtual Apps servers](#)

[Installing Automation Anywhere remote agent for Citrix on Citrix servers](#)

[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.

### Procedure

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 AAARemoteAgent.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\AAARemoteAgent
  - 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 AAARemoteAgent.

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Related concepts

[Citrix integration on Cloud](#)

Related tasks

[Using the Recorder on Citrix Virtual Apps servers](#)

[Installing the Citrix required components on local machines](#)

[Using Citrix XenDesktop on Cloud](#)

## HA and single-node deployments

Identify your key requirements before selecting a deployment model. Automation Anywhere Enterprise offers multiple deployment options to meet various levels of enterprise cost/price performance and resiliency needs. This includes installation on single-nodes, and Highly Available (HA) clusters.

### Planning

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 install Automation Anywhere, each depends on your business continuity requirements.

#### [Single-node deployment](#)

A single-node deployment hosts the Enterprise Control Room only on one server or machine.

#### [High availability deployment model](#)

The High availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases.

Related concepts

[High Availability overview](#)

### Single-node deployment

A single-node deployment hosts the Enterprise Control Room only on one server or machine.

A single-node deployment is recommended for proof-of-concepts, demos, testing, and trial runs.

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

If a single-node deployment is used for production (not recommended), 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 Bot Runners increase, the single node will have to manage the increased load. This might adversely affect the RPA performance.

## High Availability overview

High Availability (HA) provides a failover solution in the event a Enterprise Control Room service, server, or database fails.

## Automation Anywhere HA and DR solution

In the context of Automation Anywhere, implementation of High Availability (HA) reduces downtime and maintains continuity of business (CoB) for your bot activities.

- High Availability (HA)—refers to a system or component that is continuously operational for a desirably long period.

HA is required for production deployments of Automation Anywhere.

Automation Anywhere leverages your existing HA infrastructure. We do not provide an internal HA solution. Rather the Automation Anywhere components and configuration leverage your existing HA infrastructure, load balancing, and failover systems to protect your bots and related data. See your data center administrator for your approved local HA procedures.

## Required HA and DR infrastructure elements

- Distributed Approach—Enterprise Control Room is flexible enough to process a large number of requests. Deploy multiple instances of Enterprise Control Room on multiple physical or virtual servers as needed.
- Load balancing—Performed by a load balancer, this is the process of distributing application or network traffic across multiple servers to protect service activities and allows workloads to be distributed among multiple servers. This ensures bot activity continues on clustered servers.

For load balancer configuration details, see [Load balancer requirements](#).

- Databases—Databases use their own built-in failover to protect the data. This ensures database data recovery.
  - Between the HA clusters, configure synchronous replication between the primary (active) and secondary (passive) clustered MS SQL servers in the data center. This ensures consistency in the event of a database node failure.

For the required HA synchronous replication, configure one of the following:

- Backup replica to Synchronous-Commit mode of SQL Server Always On availability groups
- SQL to Server Database Mirroring

## Sample scenario

Point all Enterprise Control Room instances within the same cluster to the same database and repository files. This is required to enable sharing data across multiple servers.

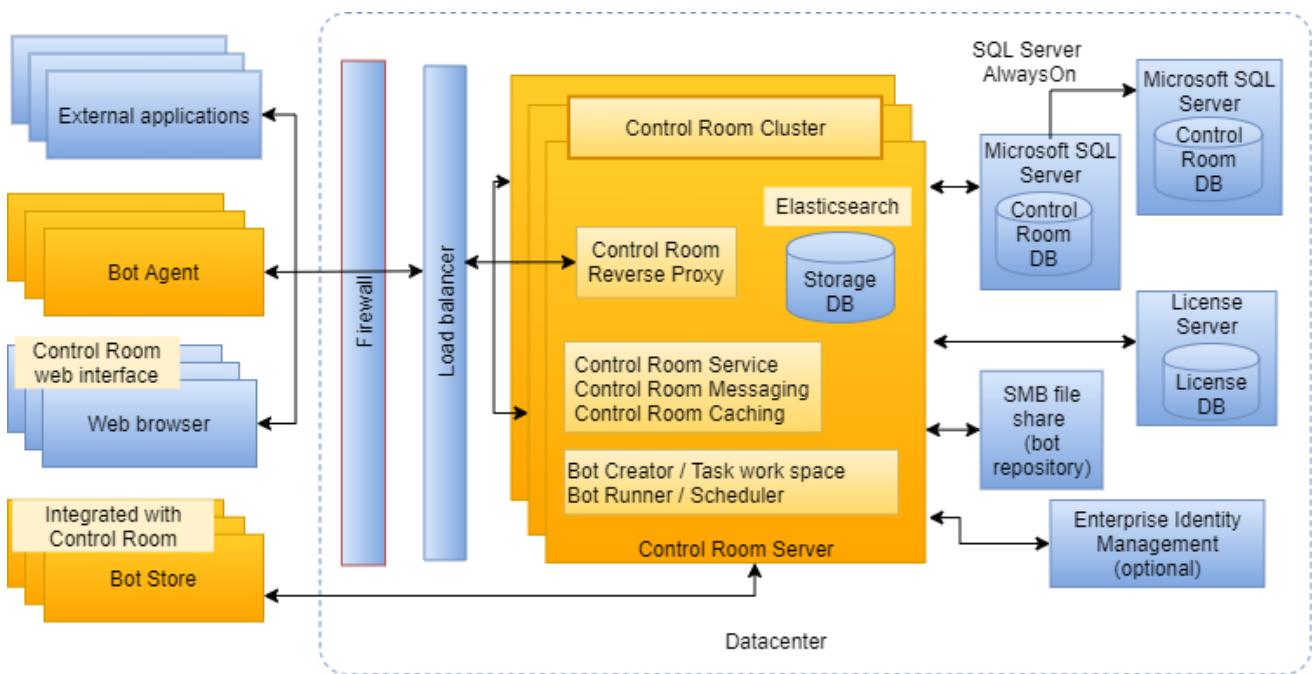
## HA deployment model

To ensure your Automation Anywhere is protected by HA, configure your data centers according to the deployment models described in: [High availability deployment model](#)

### High availability deployment model

The High availability (HA) deployment model provides failure tolerance for the Enterprise Control Room servers, services, and databases.

The following image shows the Automation Anywhere and data center components:



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.
- Multiple Bot Runners 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.

## HA cluster configuration overview

To support Automation Anywhere in your data center, configure an HA cluster. Follow your company methods and procedures for implementing your data center cluster.

HA clusters protect services and data in the event of a server or service failure. The following is a list of processes associated with clusters.

- Database replication—Configure synchronous replication between the primary site (active) and secondary site (passive) MS SQL servers to ensure consistency in the event of a database node failure.
- Downtime—The amount of downtime depends on the number of restart attempts the administrator configures for the primary server services, the number of failovers allowed per number of hours, and the failback configuration.
- Failback—After the primary server is returned to normal, the workload can be failed back from the secondary servers to the primary servers. The primary server becomes the active server again.

Restoring operations to the primary system or site after a failover or disaster recovery on a secondary system or site.

- Failover—if one of the primary servers fails, the workload of the failed server automatically shifts to the secondary server in the cluster. This automatic process is called failover. Failover ensures continuous availability of applications and data. When failover completes, the secondary server becomes the active server.

When a (primary) system detects a fault or failure, it automatically transfers control to a (secondary) duplicate system. This applies to HA clusters, where failover is from one server to another.

- Graceful degradation—Process allowing cluster dependencies to operate gracefully on a degraded primary site.
- Redundancy—HA clusters use redundancy to prevent single points of failure (SPOF), such as a failed server or service. HA clusters include primary (active) servers that host services or databases and secondary (passive) servers that host replicated copies of the services and databases.
- Replication—The secondary servers have the same configuration and software as the primary servers, they are a duplicate (redundant copy) of the primary. Data is replicated (copied) from the primary servers to the secondary servers.

---

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 failover 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 failover. 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.

## Enterprise A2019 On-Premises Enterprise Control Room installation

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](#).

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](#)

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](#)

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](#)

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 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.

### Step 3: Post-installation

#### [Configuring post-installation settings](#)

#### [Verifying Automation Anywhere services](#)

Automation Anywhere specific services are installed on the Enterprise Control Room server.

### Step 4: Validation

#### [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.

## 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](#).

### Prerequisites

- Verify [Enterprise A2019 On-Premises prerequisites](#).

- 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
Port	1433

## Procedure

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 the SQLEXPRESS 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](#).
  3. Click Next on the Welcome to the Setup Wizard page.
- The installation process checks the availability of the following components:
- Microsoft Visual C++ 2013 Redistributable Package
  - Microsoft OLEDB Driver for SQL Server
- If any of the above components are not available, the system notifies you with an installation message window. When both components are successfully installed, the Deployment Option page appears.
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.

## Next steps

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed. Proceed to [Enterprise Control Room post-installation configuration](#).

Related concepts

[Installing Enterprise Control Room using Custom mode](#)

## 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](#).

#### Step 1: Prepare for installation

- Verify [Enterprise A2019 On-Premises prerequisites](#).
- Ensure that you have the following:
  - Automation Anywhere Enterprise Control Room installation file
  - SSL certificate
  - License file

#### Step 2: [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.

#### Step 3: [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).

#### Step 4: [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.

#### Step 5: [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.

#### Step 6: [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.

#### Step 7: [Add Elasticsearch credentials](#)

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, you finish the installation wizard and monitor the installation progress.

#### Step 9: Complete Enterprise Control Room configuration and validation

##### [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.

##### [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.

#### Step 10: Prepare for users

##### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

## Related concepts

[Understanding Enterprise A2019 migration](#)

## 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.

## Procedure

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 the SQLEXPRESS 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](#).
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, supply new destination folder name, and click OK.  

Note: It is NOT recommended to 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).

## Prerequisites

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.

## Procedure

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, 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.

### [Transport Layer Security \(TLS\)](#)

#### Related tasks

##### [Configure application Transport Layer Security](#)

## 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.

## Procedure

1. The TLS Configuration page allows you to 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, disable the Self Signed Certificate checkbox. This configuration 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: Type the password for the private key.

Warning: Password Limitation: Do not use "@" in passwords. Using the special character "@" in the password causes the certificate file import to fail.

- Webserver Port: Type the Web server port – either HTTP or HTTPS. If the port is already assigned, an error message displays.

Attention: The port validation message is also displayed when you add 8080 for 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 via 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, that require access to all nodes, to the Subject Alternative Name field in the certificate.

2. Click Next to [Configure service credentials](#).

## 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.

## Procedure

1. The Service Credentials screen displays where you can 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) Uncheck 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](#).

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](#).

## Procedure

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](#)

- 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](#)

- d) Windows authentication: This option is selected by default and allows connection to the SQL Server using Windows authentication.

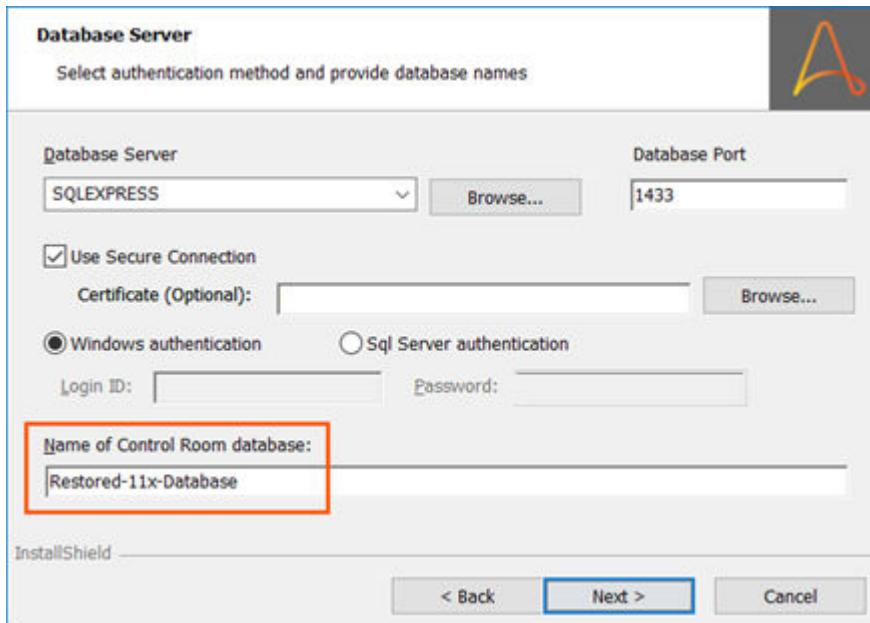
Note: If you select Windows authentication, then the user running the installer is used to test that the database exists, create it if required, and grant db\_owner to the service account user (NT Authority/System).

- 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](#). 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](#)

## 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.

### Procedure

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.

## Procedure

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](#) 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.

## Procedure

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.

## Next steps

Complete Enterprise Control Room configuration and validation.

### [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.

### [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.

### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

Related tasks

[Installing Enterprise Control Room using Express mode](#)

## 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.

## Procedure

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

[Upgrade to Enterprise A2019](#)

Related reference

[Enterprise A2019 On-Premises Enterprise Control Room installation](#)

## 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](#).

To remove Enterprise Control Room, see [Uninstall Enterprise A2019 On-Premises from Linux server](#).

## Prerequisites

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.

## Procedure

### 1. Verify the installation prerequisites.

a) Verify the [Enterprise A2019 On-Premises prerequisites](#).

b) 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](#).

c) Ensure the following files are available:

- d) SSL certificate
- e) License file

f) Download the AutomationAnywhereEnterprise\_A2019\_<linux-version>\_<build>.bin installation file to the Linux server from [A-People Downloads page \(Login required\)](#)

g) 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.

### 2. Log in to the installation server.

### 3. Run the installer command as a superuser from the Linux shell:

a)

```
$ sudo chmod +x  
AutomationAnywhereEnterprise_A2019_<linux  
-version>_<build>.bin
```

b)

```
$ sudo  
. /AutomationAnywhereEnterprise_A2019_<lin  
ux-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:

- a) 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](#)

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](#)

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](#) for the location of control room assets.

10. Configure the post-installation settings.

#### [Configuring post-installation settings](#)

11. Verify A2019 services started successfully.

#### [Stop and start Enterprise Control Room services on Linux](#)

12. Set up Enterprise Control Room access.

#### [Configure Enterprise Control Room database](#)

13. Set up licenses.

#### [Installing additional licenses](#)

## Next steps

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](#)

### Related reference

[Enterprise A2019 On-Premises Enterprise Control Room installation](#)

## 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.

## Prerequisites

- Verify you have completed the [Enterprise A2019 On-Premises prerequisites](#).
- 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.

## Procedure

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 back to return to a previous step and quit to cancel the installation.  Default is Enter	\n

Enterprise Control Room installation parameters		
Installation parameter	Description	Script response options
	.	
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 = 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 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)

Enterprise Control Room installation parameters		
Installation parameter	Description	Script response options
		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).  Enter	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.  Enter	\n
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_e17_4799.bin
sudo ./AutomationAnywhereEnterprise_A2019_e17_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.

## Next steps

Continue from the step [Configure the post-installation settings in Installing Enterprise Control Room on Linux.](#)

## Uninstall Enterprise A2019 On-Premises from Linux server

Uninstall the On-Premises Enterprise Control Room from your Linux server.

### Prerequisites

Ensure that the Enterprise A2019 installation server is disconnected from the Microsoft SQL Server database.

### Procedure

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.

### Prerequisites

Ensure that the Enterprise A2019 installation server is disconnected from the Microsoft SQL Server database.

### Procedure

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.

- `$ sudo chmod a+x LinuxUninstall.sh`
- `$ sudo ./LinuxUninstall.sh`

The script is executed:

```
=====
=====
Automation Anywhere Enterprise          (created with Install
Anywhere)
-----
-----
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 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](#).
- 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](#)

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](#)

Install and apply the customized configuration required for the Enterprise Control Room cluster on Amazon Web Services (AWS) after completing initial preparations.

## Step 4: Complete Enterprise Control Room configuration and validation.

### [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.

### [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.

## Step 5: Prepare for users.

### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On 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.

## Prerequisites

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:

## Procedure

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](#).

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:
    - b) Type: c5.2xlarge or similar instance type (8 CPU, 16 GB RAM)
    - c) Storage: Root Device: 100 GB
    - d) Storage: Additional Device: D:\ 200 GB (For Automation Anywhere Install files)
    - e) Accidental Deletion Prevention: Enabled
  - f) Access the two instances through Remote Desktop Protocol.
  - g) Add the instances to the Active Directory domain.
  - h) 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](#).
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.

## Next steps

Continue with [Customize Enterprise Control Room installation on Amazon Web Services](#).

## 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.

### Prerequisites

If you have not done so already, complete the initial installation steps in [Prepare for installation on Amazon Web Services](#).

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:

### Procedure

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.

The installation process checks the availability of the following components:

- Microsoft Visual C++ 2013 Redistributable Package
- Microsoft OLEDB Driver for SQL Server

If any of the above components are not available, the system notifies you with an installation message window. When both components are successfully installed, the Deployment Option page appears.

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, supply new destination folder name, and click OK.

Note: It is NOT recommended to 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, 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. The TLS Configuration page allows you to 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, disable the Self Signed Certificate checkbox. This configuration 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: Type the password for the private key.

Warning: Password Limitation: Do not use "@" in passwords. Using the special character "@" in the password causes the certificate file import to fail.

- Webserver Port: Type the Web server port – either HTTP or HTTPS. If the port is already assigned, an error message displays.

Attention: The port validation message is also displayed when you add 8080 for 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 via 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, that require access to all nodes, to the Subject Alternative Name field in the certificate.

12. Click Next to configure the service credentials.

13. The Service Credentials screen displays where you can 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) Uncheck 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](#).

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.

## Next steps

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](#).

### Configure settings post-installation on Amazon Web Services

After installation is complete, configure Enterprise Control Room settings on Amazon Web Services.

## Prerequisites

If you have not done so already, complete the installation steps in [Customize Enterprise Control Room installation on Amazon Web Services](#).

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:

## Procedure

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](#).

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.

## Next steps

Complete Enterprise Control Room configuration and validation.

### [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.

### [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.

### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On 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](#).
- 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](#)

Use these steps to configure third-party products for the Enterprise Control Room installation.

Step 3: [Begin Enterprise Control Room installation on Microsoft Azure](#)

Initial steps for Enterprise Control Room installation on Microsoft Azure.

Step 4: [Customize Enterprise Control Room installation on Microsoft Azure](#)

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.

### [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.

### 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.

Step 6: Prepare for users.

### Users management

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On 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:

## Procedure

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](#) for configuration and version information.

2. 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
Azure Active Directory	53, 389	Any
LDAP	3268, 3269	Any

Data center object	Port	Protocol
email SMTP	587	Any
SSH	22	Any
RDP	3389	TCP

3. 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](#).

4. Ensure the Enterprise Control Room servers in the cluster can ping each other.

If the ping is not successful:

- a) 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
```

- b) Ping the Enterprise Control Room after enabling the firewall rule change.

## Next steps

When you have completed the pre-installation configurations, [Begin Enterprise Control Room installation on Microsoft Azure](#).

## 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	<ul style="list-style-type: none"> <li>• Microsoft Windows Server 2012 and 2012 R2 Datacenter</li> <li>• Microsoft Windows Server 2016 Standard and Datacenter</li> <li>• Microsoft Windows Server 2019 Standard and Datacenter</li> </ul>	IaaS

Data center object	Supported version	Configuration
Identity management: Azure Active Directory	Azure Active Directory	<ul style="list-style-type: none"> <li>• IDaaS</li> <li>• Windows 2016 for IaaS</li> </ul>
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.

### Prerequisites

If you have not done so already, complete the pre-installation configuration in [Verify readiness for installation on Microsoft Azure](#).

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:

### Procedure

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.

The installation process checks the availability of the following components:

- Microsoft Visual C++ 2013 Redistributable Package
- Microsoft OLEDB Driver for SQL Server

If any of the above components are not available, the system notifies you with an installation message window. When both components are successfully installed, the Deployment Option page appears.

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.

### Next steps

Continue with [Customize Enterprise Control Room installation on Microsoft Azure](#).

## Customize Enterprise Control Room installation on Microsoft Azure

Install and apply the customized configuration required for the Enterprise Control Room cluster on Microsoft Azure.

### Prerequisites

If you have not done so already, complete the initial installation steps in [Begin Enterprise Control Room installation on Microsoft Azure](#). 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:

### Procedure

#### 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, 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. The TLS Configuration page allows you to 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, disable the Self Signed Certificate checkbox. This configuration 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: Type the password for the private key.

Warning: Password Limitation: Do not use "@" in passwords. Using the special character "@" in the password causes the certificate file import to fail.

- Webserver Port: Type the Web server port – either HTTP or HTTPS. If the port is already assigned, an error message displays.

Attention: The port validation message is also displayed when you add 8080 for 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 via 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, that require access to all nodes, to the Subject Alternative Name field in the certificate.

5. Click Next to configure the service credentials.

6. The Service Credentials screen displays where you can 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) Uncheck 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](#).

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](#)

- 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](#)

- d) Windows authentication: This option is selected by default and allows connection to the SQL Server using Windows authentication.

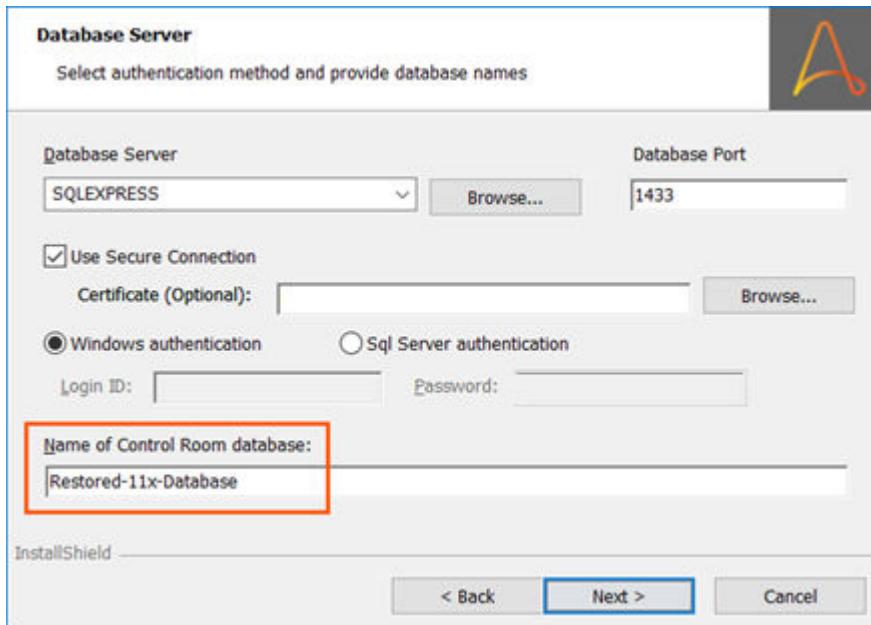
Note: If you select Windows authentication, then the user running the installer is used to test that the database exists, create it if required, and grant db\_owner to the service account user (NT Authority/System).

- 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](#). 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.

## Next steps

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](#).

### 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.

### Prerequisites

If you have not done so already, complete the installation steps in [Customize Enterprise Control Room installation on Microsoft Azure](#).

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.

## Procedure

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.

## Next steps

Complete Enterprise Control Room configuration and validation.

### [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.

### [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.

### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

## Installing Enterprise Control Room 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.

### Prerequisites

- Verify [Enterprise A2019 On-Premises prerequisites](#).
- 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.

### Procedure

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_CRFORCEHTTPS CONFIG=" "	-
AA_CRFORCETOHTTPS="1"	Force traefik from HTTP to HTTPS
AA_CRHTTPPORT	CR HTTP port. Default is 5432

Enterprise Control Room installation parameters	
Variable Name	Description
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_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

Enterprise Control Room installation parameters	
Variable Name	Description
IS_SQLSERVER_DATABASE	SQL Database name
IS_SQLSERVER_SERVER	SQL server name (host name)
Elasticsearch Related Parameters	
AA_ELASTICSEARCH_BACKUP	<p>Used only if installing on first node of a backup server.</p> <p>Enter 1 if yes.</p> <p>Note: The AA_ELASTICSEARCH_BACKUP parameter is used when you install an Enterprise Control Room as back up server for audit.</p>
AA_ELASTICSEARCHSYSIP	Valid IP
AA_ESPASSWD	<p>Password for Elasticsearch</p> <p>Note: Additional parameter for confirming the password is not available. The password must have minimum 6 characters.</p>

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, \$cr\_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:

```
$cr_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_CRSELFSCIGNCERT=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.

## Next steps

Complete Enterprise Control Room configuration and validation.

### [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.

### [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.

### [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

## 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.

## Procedure

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.

### [Enterprise A2019 On-Premises Enterprise Control Room installation](#)

3. Log in to the On-Premises Enterprise Control Room.  
[Log in to Automation Anywhere Enterprise Control Room](#)
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](#)

Related tasks

[Install Bot agent and register device](#)

Related reference

[Installed Enterprise Control Room directories and files](#)

## 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.

[Configuring post-installation settings](#)

## Verifying Automation Anywhere services

Automation Anywhere specific services are installed on the Enterprise Control Room server.

## 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 English (United States) as the region setting.

- Windows: Select Control Panel > Region > Administrative > Change system locale.
- 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 LANG
UAGE
```

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 concepts

[Enterprise Control Room post-installation configuration](#)

Related reference

[Verifying Automation Anywhere services](#)

[Working with SQL Servers](#)

## 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](#).

## 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.

Service name	Description
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 <a href="#">Elastic Stack and Product Documentation</a> .
Automation Anywhere Control Room Discovery Bot Service	Used for Discovery Bot.

Note: 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.

Related concepts

[Installing Enterprise Control Room using Custom mode](#)

Related tasks

[Installing Enterprise Control Room using Express mode](#)

[Installing Enterprise Control Room on Linux](#)

## 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:

### Procedure

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.

## Next steps

Proceed to [Configure Enterprise Control Room authentication options](#). If you have already configured it, then log in to the Enterprise Control Room.

Related tasks

[Import HTTPS and CA certificates](#)

### 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.

### Procedure

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
```

## 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

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

#### Users management

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

#### Related concepts

[Enterprise Control Room post-installation configuration](#)

## 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](#)

[Configure Enterprise Control Room for Active Directory: manual mode](#)

[Configure Enterprise Control Room for Active Directory: auto mode](#)

[Configure Enterprise Control Room database](#)

[Configure Enterprise Control Room for HTTPS self-signed certificate](#)

### 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:

### Procedure

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.

## Next steps

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:

## Procedure

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 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.

## Next steps

After configuring the Enterprise Control Room, install product licenses.

### Related tasks

[Configure Enterprise Control Room for Active Directory: auto mode](#)

### 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:

## Procedure

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.

## Next steps

After configuring the Enterprise Control Room, install product licenses.

### Related tasks

[Configure Enterprise Control Room for Active Directory: manual mode](#)

[Configure Enterprise Control Room database](#)

## 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:

## Procedure

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.

## Next steps

Install a license.

Related tasks

[Configure Enterprise Control Room for Active Directory: manual mode](#)  
[Configure Enterprise Control Room for Active Directory: auto mode](#)

## Configure Enterprise Control Room for HTTPS self-signed certificate

Configure 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:

### Procedure

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.

### Next steps

Proceed to [Configure Enterprise Control Room authentication options](#). If you have already configured it, then log in to the Enterprise Control Room.

Related tasks

[Import HTTPS and CA certificates](#)

## 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.

### Procedure

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"
```

- 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.

## Prerequisites

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.

## Procedure

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:

0. Open the command window.
1. Enter **MMC** to launch the console window.
2. Select File > Add/Remove Snap-in.
3. Double-click Certificates and then select My user account in the Certificates snap-in window.
4. Click Finish and OK to return to the console window.  
The console window now shows certificates for current user.
5. 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.

0. Enter <root>:\Program Files\Automation Anywhere\Bot Agent\jre\bin to navigate to the Java Runtime Environment (JRE) path on the Bot agent device.
1. 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.

2. Enter the password as  
changeit

3. Enter

Y

at the next prompt.

The Enterprise Control Room self-signed certificate is imported successfully.

4. 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 [Users management](#).

## 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).

## Prerequisites

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](#).

## Procedure

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	Description
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.

## Next steps

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.

## Procedure

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.

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
/opt/automationanywhere/enterprise	All binary files	
/opt/automationanywhere/enterprise/config	Config files	
/var/log/automationanywhere/enterprise	Log files	
/tmp	Temporary files	Directory that contains temporary

Directory path	Description	Comments
		files created by the system and users.  Files under this directory are deleted when the system is rebooted.
/opt/automationanywhere/enterprise/appdata	Server files	Enterprise Control Room repository folder.
/opt/automationanywhere/enterprise/_Automation\ Anywhere\ Enterprise_installation/Logs/	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.

## 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	The Bot Creator license provides the capability to create, schedule, trigger, and edit bots.
Bot Runner	The Bot Runner license provides authorization to 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

License	Permission
	Anywhere Enterprise Control Room deployment, centralized scheduling, and API-based deployment.
Attended Bot Runner Run-time license	Users with privilege to run bots on their workstations. These users cannot run or schedule a bot to run on another device or workstation.
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. Bot Insight Analytics license is purchased on a per user basis.
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.

## 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.

- [Accessing Enterprise A2019](#)

Any new customer who orders Automation Anywhere Enterprise products are to receive license confirmation from Automation Anywhere.

- [Configure new Enterprise Control Room licenses](#)

The Enterprise Control Room in your order now requires configuration to generate and download new licenses.

## 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.
Trial License	A trial license is shipped with validity of 30 days; on expiry of <a href="#">Trial licenses</a> 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:

### Procedure

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:

## Procedure

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 Environment 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 generated 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.

## 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:

## Procedure

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.

## Upgrade to Enterprise A2019

Upgrade to the latest Enterprise A2019 version from Versions 11.x, 10.x, or from earlier Enterprise A2019 versions.

### Plan your upgrade

- Review the Automation Anywhere Enterprise 11.x and 10.x versions that are supported for migration to Enterprise A2019.

#### [Supported versions for 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.

#### [Use Bot Scanner](#)

### Choose your upgrade path

Choose your upgrade 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 upgrade procedure
11.x	<a href="#">Upgrade to Enterprise A2019 On-Premises</a>
10.x	<a href="#">Upgrade to Enterprise A2019 On-Premises</a>
Enterprise A2019	<a href="#">Upgrade from an earlier Enterprise A2019 version to latest version</a>

### 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 A2019. The migration capability is available in 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 A2019.

A new version of Bot Scanner is released on a monthly basis. You can use the latest version of the Bot Scanner to monitor which commands and variables are supported for migration in A2019 with each update. You can run the tool without installing A2019.

The Bot Scanner is available from the [A-People Downloads page \(Login required\)](#). See [Use Bot Scanner](#) for instructions on using the tool.

**Important:** You can help improve migration to 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.

[Bot scanner video](#)

#### Migration wizard

This tool is integrated in 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 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.

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](#).

Migration to A2019 on Linux is not yet supported.

## 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](#)

[Enterprise Control Room operating system compatibility](#)

## 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.

Migration to A2019 on Linux is not yet supported.

### 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	
11.3.4.3	
11.3.3.3	
11.3.2.4	
11.3.2.2	
11.3.2.1	
11.3.2	
11.3.1.7	
11.3.1	
11.3	
11.2.1.4	
11.2.1.3	
11.2.1.2	
11.2.1	

### 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	
10.5.112	
10.5.16	

10.x versions to Enterprise A2019 On-Premises
10.5.15
10.5.11
10.5.5
10.5.0
10.3.11
10.3.9
10.3.5

## Upgrade from 11.x to Enterprise A2019 On-Premises

Perform the tasks in this workflow to upgrade from Automation Anywhere Enterprise 11.x to Enterprise A2019 On-Premises, including migration of your bots to Enterprise A2019.

### Prerequisites

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.

Note: 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.

### Procedure

#### 1. Prepare for upgrade:

- Review the Automation Anywhere Enterprise 11.x versions that are supported for migration to Enterprise A2019 On-Premises.

#### [Supported versions for migration](#)

- Compare the Enterprise A2019 and the Automation Anywhere Enterprise 11.x features to understand feature equivalency in A2019.

#### [Enterprise A2019 feature comparison matrix](#)

- 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 | Variable mapping for migration](#)

- 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](#)

2. Install Enterprise A2019 On-Premises:

- a) Ensure you meet the system requirements.

[Enterprise A2019 On-Premises prerequisites](#)

- b) Install Enterprise A2019 On-Premises Enterprise Control Room in custom mode to a staging environment.

[Installing Enterprise Control Room using Custom mode](#)

Important: During the installation, configure the 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 A2019.

[Migrate Enterprise bots](#)

5. Optional: Migrate audit log data.

[Migrate 11.x audit logs](#)

6. Verify the migration is complete:

- [Migration reports](#)
- [Verify the bot migration](#)
- [Export to CSV](#)

## Copy and paste 11.x information to A2019

The 11.x server repository files and the credential vault file are required in the A2019 environment. The most efficient way to get this data is to copy them 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.

## Procedure

1. Copy all the files and folders in 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.

Note:

- The CredentialVault.dat file is contained in the 11.x repository, so you do not need to copy the file separately.

[Configuration settings](#)

2. Paste the copied repository at any location on the same device or on a different device.

For example, C:\Program Data\Automation Anywhere\Server Files\Default\0\Automation Anywhere\Bots

In the above 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 (\Default\0\Automation Anywhere\Bots) is a constant path that does not change.

You must create the entire folder structure manually, including the dynamic path. For example, if you want to paste the 11.x repository at D:\A2019, you must create the following folder structure: D:\A2019\Default\0\Automation Anywhere\Bots. The D:\A2019 in the folder structure is the dynamic path that is followed by the constant path: \Default\0\Automation Anywhere\Bots.

3. Update the Enterprise Control Room access URL and repository path. Run the following SQL commands to update the access URL and repository path:
- 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 '/' at the end of the access URL that you provide in the above command.
  - 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.

## Next steps

After A2019 installation is complete, perform these steps:

- Log in to A2019.
- Navigate to Bots > My Tasks.
- Verify that all the data you pasted are available in the relevant files and folders.

## 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.

## Prerequisites

Ensure you have the AAE\_Admin role or the Manage Migration permission.

## Procedure

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:
  - 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.
    - Navigate to the Automation Anywhere Downloads page: [A-People Downloads page \(Login required\)](#).
    - Click the Automation Anywhere Enterprise A2019 setup file.

- 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.
2. Extract the files from the zip file you have downloaded.
3. Open the Windows command prompt.
4. 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>.ja
r 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.
- Note:

- 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_Aud
it_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`.

5. Create the `migration\es-data` folders in the Enterprise A2019 repository.
  6. Copy the JSON file available at the output location.  
If the utility has generated multiple JSON files, you must copy all the files.
  7. Paste the JSON file in the `Server Files\migration\es-data` folder.
  8. Log in to your Enterprise A2019 staging environment.
  9. Go to Administration > Migration.
  10. 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 `es_export.json` file and uploading it to Enterprise A2019 Elasticsearch. The entries are displayed in the Audit Log tab of Enterprise A2019.
- For version 11.2 and earlier:
    1. Log in to your Enterprise A2019 staging environment.
    2. Go to Administration > Migration.
    3. 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.

## 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](#)

- `$WorkItemResult$` – 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](#)

Related tasks

[Edit device pools](#)

[Use Work Item variables](#)

## Upgrade from 10.x to Enterprise A2019 On-Premises

Perform the tasks in this workflow to upgrade from Automation Anywhere Enterprise 10.x to Enterprise A2019 On-Premises, including migration of your bots to Enterprise A2019.

### Procedure

#### 1. Prepare for upgrade:

- Review the Automation Anywhere Enterprise 10.x versions that are supported for migration to Enterprise A2019 On-Premises.

[Supported versions for migration](#)

- Compare the Enterprise A2019 and the Automation Anywhere Enterprise 10.x features to understand feature equivalency in A2019.

#### [Enterprise A2019 feature comparison matrix](#)

- 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](#)

- b) Install Enterprise A2019 On-Premises Enterprise Control Room in custom mode to a staging environment.

#### [Installing Enterprise Control Room using Custom mode](#)

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](#)

5. Migrate the 10.x bots to A2019.

#### [Migrate Enterprise bots](#)

6. Verify the migration is complete:

- [Migration reports](#)
- [Verify the bot migration](#)
- [Export to CSV](#)

## Copy 10.x data

You must copy the 10.x data to Enterprise A2019 before you convert the 10.x bots.

## Procedure

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.

Option	Action
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.

## Next steps

[Migrate Enterprise bots](#)

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](#)[Related tasks](#)[Enable schedules after migration](#)

## 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	<p>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.</p> <p>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.</p>
Roles	<p>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.</p> <p>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.</p> <p>Subsequent data copy operations will skip previously migrated roles.</p>
Licenses	The migration process automatically migrates user allocated licenses, but they are not shown in the migration report. If the A2019 Enterprise Control

10.x items	How 10.x items are copied to Enterprise A2019
	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	<p>For system credentials associated with a migrated user, the system migrates only the Email Settings and Autologin Settings system credentials.</p> <p>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.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>Migration of credentials with more than 50 attributes is not supported.</li> <li>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.</li> </ul>
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.
Schedules	<p>If duplicate schedules exist in both environments, the duplicate schedule is migrated and results in two schedules of the same name in Enterprise A2019.</p> <p>Migration of schedules fails if the associated user does not exist in Enterprise A2019.</p>

#### Related tasks

[Copy 10.x data](#)

[Enable schedules after migration](#)

## Upgrade from earlier Enterprise A2019 versions to latest version

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

### Prerequisites

Back up your database, repository, and installation configuration files.

Important: When you upgrade 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 upgrade.

- 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](#).

## Procedure

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.  
[Enterprise A2019 On-Premises Enterprise Control Room installation](#)  
Important: You must use the SQL database of the current version in the newer version of Enterprise A2019.

Related concepts

[Upgrade to Enterprise A2019](#)

## 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)

## Use 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.

## Procedure

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 setup file.
  - 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.
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.  
**Attention:** The permanently deletes all the files that are in the destination folder.
5. Click Create report.  
 The Bot Scanner starts analyzing the bots available in the repository.  
**Note:** If the Bot Scanner scans a bot for more than 15 minutes, Bot Scanner stops scanning that bot and proceeds with scanning other bots in the repository.
6. 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.
7. 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.

## Next steps

[Analyze reports](#)

Related reference

[Bot Scanner overview](#)

[Analyze reports](#)

## 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 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.
- 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 bots that cannot be migrated because of these commands or variables.
- 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 $AAApplicationPath$</e
rror>

    <error count="1">Command [If FolderNotExist]
        is not supported</error>

    <error count="3">System variable $CurrentDirectory$</er
ror>

    <error count="3">System variable $Extension$</error>
</errors>
</stat>
<commands>
    <command target-action="assign" name="VariableOperation" li
ne="1"
        grp="VariableOperation" api="VarOpe">
        <msg type="error" review="true" category="variable">Sys
tem
            variable $AAApplicationPath$</msg>
        <msg type="info" review="false" category="default">Comm
and
            parameter [Option] of type [String] is not required.</m
sg>
    </command>
    <command target-action="createFolder" name="createFolder" l
ine="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 type="info" review="false" category="command">Lin
e
            in 11.x client, there is no separate option given for C

```

SV

```

        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.
--	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.

Node	Attribute	Description
--	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.

This package has the following expressions:

- `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.
- `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.
- `GetDecrementedException` – Decrements the value of the respective variable by 1. It is used mostly in the index positions of List, Record or Datatable variables.
- `GetIncrementedException` – Increments the value of the respective variable by 1. It is used mostly in the index positions of List, Record or Datatable variables.

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.

#### [How MetaBots are migrated](#)

- 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.
- 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	<ul style="list-style-type: none"> <li>For the Insert mouse click command, use the Screen for window title option.</li> <li>For the Insert keystroke command, use the Current Active Window option.</li> <li>For Screen &gt; Capture area, use the Screen for window title option.</li> </ul>
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.
- 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](#).

- Some commands return values to variables for further processing. In 10.x/11.x, users can store these values in different types of variables, whereas 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 disable 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
Active Directory	<p>Respective Active Directory commands are migrated to the Connect and Disconnect actions. Each command is migrated as follows:</p> <ul style="list-style-type: none"> <li>Modify group command with the Rename group option is migrated to the Rename group action.</li> <li>Modify group command with the Delete group option is migrated to the Delete group action.</li> <li>Modify group command with the Add users to group option is migrated to the Add users to group action.</li> <li>Modify group command with the Remove users from group option is migrated to the Remove users from group action.</li> <li>Modify group command with the Set property option is migrated to the Set group property action.</li> <li>Modify group command with the Disable user account option is migrated to the Disable user account action.</li> <li>Modify group command with the Update user details option is migrated to the Update user details action.</li> <li>Modify user command with the Rename user option is migrated to the Rename user action.</li> <li>Modify user command with the Delete user option is migrated to the Delete user action.</li> <li>Modify user command with the Enable user account option is migrated to the Enable user account action.</li> <li>Create object command with the Computer object option is migrated to the Create computer action.</li> <li>Create object command with the Organizational unit object option is migrated to the Create organizational unit action.</li> <li>Search command with the Run Query option is migrated to the Run query action.</li> <li>Search command with the Get all users of a Group is migrated as Get all users of a group.</li> <li>Get property command with the User option is migrated to the Get user property action.</li> <li>Get property command with the Group option is migrated to the Get group property action.</li> </ul>

Package	How it is migrated to A2019				
	<ul style="list-style-type: none"> <li>Get property command with the Computer option is migrated to the Get computer property action.</li> <li>Get property command with the Organizational unit option is migrated to the Get organizational unit property action.</li> </ul>				
App Integration	<p>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.</p> <p>Capture text from</p> <p>All 10.x/11.x App Integration commands that capture text from a window is migrated to the App Integration &gt; Capture text from window action in A2019.</p> <p>Capture area</p> <p>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.</p>				
Clipboard	<p>All commands of Clipboard are migrated to equivalent actions of the A2019 Clipboard package. There is no change in behaviour or command name.</p> <p>See <a href="#">Clipboard package</a>.</p>				
Comment	Comment is migrated to A2019 Comment action.				
Database	<p>10.x/11.x uses ODBC drivers and A2019 uses JDBC drivers.</p> <p>The SQL Query action is called Read from in A2019.</p> <p>The following table shows the commands that currently can be migrated.</p> <table border="1"> <thead> <tr> <th>10.x/11.x</th><th>A2019</th></tr> </thead> <tbody> <tr> <td>Connect</td><td> <p>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.</p> <p>0 is not a valid time out value in A2019. The migration process replaces 0 with an empty value.</p> </td></tr> </tbody> </table>	10.x/11.x	A2019	Connect	<p>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.</p> <p>0 is not a valid time out value in A2019. The migration process replaces 0 with an empty value.</p>
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Package	How it is migrated to A2019									
	10.x/11.x	A2019								
	Run Stored Procedure	The parameter name and output parameter are mandatory fields in A2019.								
	See <a href="#">Database package</a> .									
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 <a href="#">Delay package</a> .									
Email	<p>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.</p> <p>The Save attachment option of the Get All Messages command is now a dedicated action called Save attachment in the Email package in A2019.</p> <p>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.</p> <p>See <a href="#">Email package</a>.</p>									
Error Handling	<p>Disabled Error Handling commands are not migrated to A2019.</p> <p>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:</p> <table border="1"> <thead> <tr> <th>10.x/11.x</th><th>A2019</th></tr> </thead> <tbody> <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> <p>Capture screen action of the Screen package is added in the Catch block in A2019. Additionally, 10.x/11.x captures the screen with the error dialog; where as A2019 does not show the error dialog while capturing the screen.</p> <p>If the file path only contains the folder name, the migration process adds</p> </td></tr> </tbody> </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	<p>Capture screen action of the Screen package is added in the Catch block in A2019. Additionally, 10.x/11.x captures the screen with the error dialog; where as A2019 does not show the error dialog while capturing the screen.</p> <p>If the file path only contains the folder name, the migration process adds</p>
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Package	How it is migrated to A2019															
	10.x/11.x	A2019														
		"Snapshot.png" because A2019 requires the complete file path.														
	Run Task	Run action of the Task package is added in Try block.  When a child bot encounters an error, the bot continues with the execution of the next action of the parent bot.														
	Log Data into File	Log to File action is added in Catch block.														
	Send Email	Send action from the Email package is added to the Catch block.														
	Variable Assignment	Assign action of the String package is added with respective the condition in the Catch block.														
	See <a href="#">Error handler package</a> .															
Excel	<p>The 10.x/11.x Excel commands are migrated to respective A2019 actions of the Excel Advanced package.</p> <p>In 10.x/11.x, data returned by Get Multiple Cells and Get All Cells commands are returned to the Loop &gt; Each Row in an Excel Dataset command. In A2019, the functionalities of Get Multiple Cell and Get All Cells are available in Loop &gt; Each Row in an Excel Dataset action, so values from these commands are migrated to the loop instead of actual actions.</p> <p>The following table shows action name changes:</p> <table border="1"> <thead> <tr> <th>10.x/11.x</th><th>A2019</th></tr> </thead> <tbody> <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> </tbody> </table>		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
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															
See <a href="#">Excel advanced package</a> .																

Package	How it is migrated to A2019																														
File/Folder	<p>All commands of File/Folder have been split into File and Folder packages.</p> <p>The following File related actions have changed in A2019:</p> <table border="1"> <thead> <tr> <th>11.x</th><th>A2019</th></tr> </thead> <tbody> <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> </tbody> </table> <p>The following Folder related actions have changed in A2019:</p> <table border="1"> <thead> <tr> <th>11.x</th><th>A2019</th></tr> </thead> <tbody> <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> </tbody> </table> <p>See <a href="#">File package</a>) and Folder and <a href="#">Folder package</a>.</p>	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 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 Files	Copy action of the File package																														
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Open Folder	Open action of the Folder package																														
Rename Folder	Rename action of the Folder package																														
FTP/SFTP	<p>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.</p> <p>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.</p>																														
If/Else > Variable	<p>Variables containing string condition</p> <p>We migrate IF with the following operators as a String condition in A2019:</p> <ul style="list-style-type: none"> <li>• =</li> <li>• &lt; &gt;</li> </ul>																														

Package	How it is migrated to A2019														
	<ul style="list-style-type: none"> <li>• Include</li> <li>• Does not Include</li> </ul> <p>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.</p> <p>Variable containing number condition We migrate IF with the following operators as a Number condition in A2019:</p> <ul style="list-style-type: none"> <li>• <math>\geq</math></li> <li>• <math>\leq</math></li> <li>• <math>&gt;</math></li> <li>• <math>&lt;</math></li> </ul> <p>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.</p> <p>Value type variable containing date</p> <p>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.</p> <p>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>.</p> <p>See <a href="#">If package</a>.</p>														
If/Else (Other conditions)	<p>The table below shows how various conditions are migrated to the respective A2019 conditions.</p> <table border="1"> <thead> <tr> <th>10.x/11.x</th><th>A2019</th></tr> </thead> <tbody> <tr> <td>Task Successful or Task Unsuccessful</td><td>Migrated to the equivalent If condition of Task Bot package.</td></tr> <tr> <td>Script Successful or Script Unsuccessful</td><td>Script successful/unsuccessful is migrated to respective If &gt; Script Successful and If &gt; Script Unsuccessful actions of the Legacy automation 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> </tbody> </table>	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 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.
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 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.														

Package	How it is migrated to A2019	
If	10.x/11.x	A2019
	Ping Successful Or Ping Unsuccessful	Migrated to the equivalent If condition of the Ping package.
	Web Control Exists or Web Control Does Not Exists	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: <ul style="list-style-type: none"> <li>• If &gt; Condition &gt; Window Exists</li> <li>• If &gt; Condition &gt; Window Does Not Exist</li> </ul>
	Logic Successful/Logic Unsuccessful	The Ifcommand is migrated to If > Task Successful and If > Task Unsuccessful respectively.  The Elseif command is migrated to Else If > Task Successful and Else If > Task Unsuccessful respectively.
	Service is running/Service is not running	The If command is migrated to If > Service is running and If > Service is not running.  The Elseif command is migrated to Else If > Service is running and Else If > Service is not running.
Image Recognition		
The If command with the Image Recognition condition in 10.x/11.x can become one of the following actions in A2019 based on the selected 10.x/ options:		
<ul style="list-style-type: none"> <li>• If &gt; Image file is found in image file – Created if <u>Image1</u> has the "From File" option selected and <u>Image2</u> has the "From File" option selected in 10.x/11.x.</li> <li>• If &gt; Image file is found in a window – Created if <u>Image1</u> has the "From File" option selected and <u>Image2</u> has the "From Window" option selected in 10.x/11.x.</li> <li>• If &gt; Window is found in image file – Created if <u>Image1</u> has the "From Window" option selected and <u>Image2</u> has the "From File" option selected in 10.x/11.x.</li> <li>• If &gt; Window is found in a window – Created if <u>Image1</u> has the "From Window" option selected and <u>Image2</u> has the "From Window" option selected in 10.x/11.x.</li> </ul>		
See <a href="#">If package</a> .		

Package	How it is migrated to A2019																												
Image Recognition	<p>The Image Recognition command is split into Find file image inside window image and Find window image inside another window image actions in A2019.</p> <p>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.</p> <p>Migration of bots with the Image Recognition command might fail if the command is using any file type other than:</p> <ul style="list-style-type: none"> <li>• .jpg</li> <li>• .jpeg</li> <li>• .jpe</li> <li>• .jfif</li> <li>• .bmp</li> <li>• .gif</li> </ul> <p>See <a href="#">Image Recognition package</a>.</p>																												
Insert Keystrokes	<p>This command is called Simulate Keystrokes in A2019.</p> <p>The following keystroke conventions have changed:</p> <table border="1"> <tbody> <tr> <td>10.x/11.x</td><td>A2019</td></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> </tbody> </table> <p>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.</p>	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]																												
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[RIGHT ARROW]	[RIGHT-ARROW]																												
[DOWN ARROW]	[DOWN-ARROW]																												
[ALT GR DOWN]	[ALT-GR DOWN]																												
[ALT GR UP]	[ALT-GR UP]																												
[\$]	[DOLLAR]																												

Package	How it is migrated to A2019
	See <a href="#">Simulate keystrokes package</a> .
Launch Website	<p>This command is migrated to Launch website of the Browser package in A2019.</p> <p>Microsoft Edge is not yet supported in the Launch Website action in A2019. Commands with "Edge" or "Override default browser" option unselected in the legacy product is automatically changed to use Default Browser upon migration.</p> <p>See <a href="#">Browser package</a>.</p>
Log to File	<p>This command is migrated to Log to file action in A2019.</p> <p>See <a href="#">Log To File package</a>.</p>
Loop	<p>The following list explains how various iterator conditions of Loop are migrated to A2019.</p> <ul style="list-style-type: none"> <li>• Loop with Times is migrated to loop with For n times iterator of the Loop package.</li> <li>• Loop with List is migrated to loop with For n times iterator of the Loop package.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• The following commands configured with the "Show child and hidden windows" option selected are migrated to the A2019 Legacy Automation package: <ul style="list-style-type: none"> <li>• Loop &gt; Condition &gt; Window Exists</li> <li>• Loop &gt; Condition &gt; Window Does Not Exist</li> </ul> </li> </ul>

Package	How it is migrated to A2019						
Loop > Condition > Variable	<p>Variable containing string conditions</p> <p>We migrate IF with the following operators as a String condition in A2019:</p> <ul style="list-style-type: none"> <li>• =</li> <li>• &lt; &gt;</li> <li>• Include</li> <li>• Does not Include</li> </ul> <p>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.</p> <p>Variable containing number conditions</p> <p>We migrate IF with the following operators as a Number condition in A2019:</p> <ul style="list-style-type: none"> <li>• &gt;=</li> <li>• &lt;=</li> <li>• &gt;</li> <li>• &lt;</li> </ul> <p>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.</p> <p>Variable containing date conditions</p> <p>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.</p> <p>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.</p> <p>List type variable</p> <p>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.</p>						
Loop > Condition (other)	<p>Refer to the table below to see how various conditions are migrated to the respective A2019 conditions.</p> <table border="1"> <tr> <td>10.x/11.x</td><td>A2019</td></tr> <tr> <td>Web Control Exists or Web Control Does Not Exists</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> </table>	10.x/11.x	A2019	Web Control Exists or Web Control Does Not Exists	Migrated to the equivalent If condition of the Legacy Support package.	Object Properties	Migrated to the Object condition of the Recorder package.
10.x/11.x	A2019						
Web Control Exists or Web Control Does Not Exists	Migrated to the equivalent If condition of the Legacy Support package.						
Object Properties	Migrated to the Object condition of the Recorder package.						

Package	How it is migrated to A2019							
	10.x/11.x	A2019						
	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.						
	<p>Web Control Exists or Web Control Does Not Exist</p> <p>Loop with Web control exists and Web control does not exist conditions are migrated to Loop &gt; While conditions Web control exists and Web control does not exist of the Legacy Automation package respectively.</p>							
Loop (supporting commands)	<p>The following table shows the Loop commands supported for migration and their respective mappings in A2019.</p> <table border="1"> <thead> <tr> <th>10.x/11.x Command</th><th>A2019 Actions</th></tr> </thead> <tbody> <tr> <td>Exit Loop</td><td>Break</td></tr> <tr> <td>Continue</td><td></td></tr> </tbody> </table>		10.x/11.x Command	A2019 Actions	Exit Loop	Break	Continue	
10.x/11.x Command	A2019 Actions							
Exit Loop	Break							
Continue								
Message Box	<p>This command is migrated to Message box action in A2019.</p> <p>See <a href="#">Message box package</a>.</p>							
Object Cloning	<p>This command is migrated to the Recorder package &gt; Capture action in A2019. Migration is supported for the following technologies:</p> <p>Migration is supported for applications using the following technologies (including when they are within a Citrix environment):</p> <ul style="list-style-type: none"> <li>• MSAA (Standard desktop technology)</li> <li>• Google Chrome browser</li> <li>• Internet Explorer browser</li> <li>• Java desktop</li> <li>• Web Java</li> <li>• UI Automation (advanced)</li> </ul>							

Package	How it is migrated to A2019
	<p>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.</p> <p>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:</p> <ul style="list-style-type: none"> <li>• The Capture action saves the captured data into a table variable.</li> <li>• 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.</li> </ul> <p>If an action in the legacy Object Cloning command is disabled, the corresponding action in the migrated bot is also disabled.</p> <p>The window title is copied from the source command to the destination action.</p> <p>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.</p> <p>The X, Y coordinates and window title are also migrated to A2019.</p> <p>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.</p> <p>Play mode as coordinates:</p> <ul style="list-style-type: none"> <li>• 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: <ul style="list-style-type: none"> <li>• Click changes to Left Button-Click</li> <li>• Right Click changes to Right Button-Click</li> <li>• Left Click changes to Left Button-Click</li> <li>• Middle Click changes to Middle Button-Click</li> <li>• Double Click changes to Left Button Double-Click</li> </ul> </li> <li>• Get Text: The Get Text action is migrated as a combination of actions that include Mouse: Click with Left Button-Click, Clipboard: Clear, Delay, and Simulate keystrokes.</li> <li>• Set Text: The Set Text action is migrated as a combination of actions that include Mouse: Click with Left Button-Click, Clipboard: Clear, Delay, and Simulate keystrokes.</li> </ul> <p>Play mode as image:</p> <ul style="list-style-type: none"> <li>• Mouse click actions - The Middle Click, Left Click, Right Click, and Double Click actions are migrated as corresponding mouse clicks in the Find window in the window action of the Image Recognition package. Note: The Middle Click action becomes Left Button-Click for the play mode as image.</li> <li>• Get Text: The Get Text action is migrated as the Capture area action of the OCR package.</li> <li>• Set Text: The Set Text action is migrated as a combination of packages and actions that include the Left Click action in the Image Recognition: Find window in window and Keystrokes action in the Simulate keystrokes packages.</li> </ul>

Package	How it is migrated to A2019	
	The following table shows the property name changes for the controls and objects captured using Object Cloning. The migration process automatically maps the name changes. However, if a property is used inside a variable, you must manually enter the new name in the variable.	
	10.x/11.x property name	A2019 property name
	Unique ID	UniqueID
	Object ID	ID
	Window Title	WindowTitle
	Type	Role
	Click X	ClickX
	Click Y	ClickY
	State(s)	States
	Action	DefaultAction
	Bold	IsBold
	Italic	IsItalic
	Underline	IsUnderline
	Strike Through	IsStrikethrough
	Super Script	IsSuperscript
	Sub Script	IsSubscript
	Background Color	BackgroundColor
	Foreground Color	ForegroundColor
	Font	FontFamily
	Font Size	FontSize
	First Line Indent	FirstLineIndent
	Left Indent	LeftIndent
	Right Indent	RightIndent
	Line Spacing	LineSpacing
	Space Above	SpaceAbove
	Space Below	SpaceBelow
	Item Name	ItemName
	Item Value	ItemValue
	Animated	IsAnimated
	CapStyle	Cap
	Font Weight	FontWeight

Package	How it is migrated to A2019	
	10.x/11.x property name	A2019 property name
	Horizontal Alignment	HorizontalAlignment
	Hidden	IsHidden
	Read Only	IsReadOnly
	Bottom Margin	BottomMargin
	Left Margin	LeftMargin
	TopMargin	TopMargin
	Right Margin	RightMargin
	Overline Color	OverlineColor
	Strikethrough Color	StrikethroughColor
	Tabs Style	Tabs
	Text Flow Direction	TextFlowDirection
	Underline Color	UnderlineColor
	HTML ID	IEID
	HTML Name	IEName
	HTML Alt	IEAlt
	HTML Tag	IETag
	HTML Class	IEClass
	HTML InnerText	IEInnerText
	HTML SourceIndex	IESourceIndex
	HTML HRef	IEHref
	HTML Value	IEValue
	HTML Type	IEType
	HTML ClassId	IEClassId
	HTML Title	IETitle
	HTML Tag Index	IETagIndex
	HTML HasFrame	IEHasFrame
	HTML FrameID	IEFrameID
	HTML Frame Name	IEFrameName
	HTML Frame Src	IEFrameSrc
	HTML Width	IEWidth
	HTML Top	IETop

Package	How it is migrated to A2019															
	10.x/11.x property name	A2019 property name														
	HTML Left	IELeft														
	HTML Height	IEHeight														
	HTML Frame Path	IEFramePath														
	Item Collection	ItemCollection														
	OCR Engine	OCREngine														
	OCR Occurrence	OCROccurrence														
	Row Control Type	RowControlType														
	See <a href="#">Using the Capture action</a> .															
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 <a href="#">OCR package</a> .															
Open Program/File	<p>This command is migrated to the Open program/file action of the Application package.</p> <p>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.</p> <p>See <a href="#">Application package</a>.</p>															
PDF	<p>Migration is supported for the following PDF commands.</p> <table border="1"> <tr> <td>10.x/11.x</td><td>A2019</td></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 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> <p>See <a href="#">PDF package</a>.</p>		10.x/11.x	A2019	Merge Document	Merge document	PDF to Image	Extract image	Extract Text	Extract text	Split Documents	Split documents	Encrypt Document	Encrypt document	Decrypt Document	Decrypt document
10.x/11.x	A2019															
Merge Document	Merge document															
PDF to Image	Extract image															
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.															

Package	How it is migrated to A2019										
Play Sound	<p>All commands of Play Sound are migrated to its equivalent actions of the Sound package in A2019.</p> <p>A2019 supports only .mp3 and .wav file types in Play media file action.</p> <p>See <a href="#">Play Sound package</a>.</p>										
Printer	<p>Default Printer, Remove Printer, and Select Default Printer are migrated to the equivalent actions of the Printer package in A2019.</p> <p>See <a href="#">Printer package</a>.</p>										
Prompt	<p>All commands of Prompt are migrated to equivalent A2019 actions of the Prompt package.</p> <p>The following table shows commands that can be migrated with name changes.</p> <table border="1"> <thead> <tr> <th>10.x/11.x</th><th>A2019</th></tr> </thead> <tbody> <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> </tbody> </table> <p>See <a href="#">Prompt package</a>.</p>	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
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	<p>The Read from CSV/Text is converted to Open, Read, and Close actions in the A2019 CSV/TXT package.</p> <p>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 &gt; Read action in the respective loop. Otherwise, you will get a UI error when you edit the A2019 bot.</p>										
Run Logic	<p>Run logic command is migrated to the Run action of the Task Bot package in A2019.</p> <p>Additionally, Error Handling with the Run Logic command is migrated to the Try and Catch block.</p>										
Run Script	The Run Script command is migrated to the Run Script action of the Legacy automation package.										

Package	How it is migrated to A2019																					
Send Email	<p>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:</p> <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
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.																					
SOAP Web Service	<p>This package behaves the same in A2019.</p> <p>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.</p> <p>See <a href="#">SOAP Web Service package</a>.</p>																					
System	<p>Lock computer, Logoff, Restart, and Shutdown actions are migrated to the equivalent actions of the System package in A2019.</p> <p>See <a href="#">System package</a>.</p>																					
Task	The following table shows the different commands that are migrated to the respective actions of the A2019 Task Bot package.																					

Package	How it is migrated to A2019	
Terminal Emulator	10.x/11.x Command	A2019 Action
	Pause	Pause
	Stop Task	Stop
	Run Task	Run. The output returned by child bots is stored in a dictionary variable and then mapped to the respective variable in the parent bots.
Variable Operation (Assign)	<p>Encrypt text is not supported in the Send Text and Set Field actions for A2019. Automation Anywhere recommends that you use Credential Vault instead of plain text.</p> <p>A2019 does not support legacy technology and by default supports all capabilities of Advance Technology of the 10.x/11.x bots.</p> <p>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.</p> <p>The following features are not yet supported in A2019:</p> <ul style="list-style-type: none"> <li>• SSH1</li> <li>• Session sharing. Without session sharing, you should close each session within the same session.</li> </ul> <p>See <a href="#">Terminal Emulator package</a>.</p>	
	<p>Value type variables</p> <p>The functionality for this command has been divided into multiple packages in A2019.</p> <p>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.</p>	
	<p>List type variables</p> <p>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.</p>	
	<p>Array type variables</p> <p>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.</p>	
	<p>Dictionary type variables</p>	

Package	How it is migrated to A2019
	<p>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 \$Dictionary(key-\$id\$) \$), then the String package &gt; Assign action is added to get the actual key.</p> <p>System variable \$Date\$</p> <p>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 – mm/dd/yyyy HH:mm:ss.</p> <p>Random variable of sub type string</p> <p>We migrate and map directly.</p>
Variable Operation (Reinitialize)	<p>List variable</p> <p>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.</p> <p>List variable declared by reading a Text file</p> <p>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.</p> <p>Array variable declared by reading a Text file</p> <p>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.</p> <p>Dictionary variable</p> <p>The migration process creates a temporary dictionary variable to store all keys and values. Then the system uses the Dictionary package &gt; Assign action to update the target variable with the keys and values from the temporary dictionary variable.</p> <p>Dictionary variable declared by reading a Text file</p> <p>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 &gt; Put action to add keys and values into the dictionary variable.</p> <p>Array variable declared by reading an Excel/CSV file</p>

Package	How it is migrated to A2019
	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.
Variable Operation (resetting system variables)	<p>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.</p> <ul style="list-style-type: none"> <li>• Email Cc</li> <li>• Email From</li> <li>• Email Message</li> <li>• Email Received Date</li> <li>• Email Received Time</li> <li>• Email Subject</li> <li>• Email To</li> <li>• Error Description</li> <li>• Error Line Number</li> </ul>
Wait	<p>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.</p> <p>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.</p> <p>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.</p>
Web Recorder	<p>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.</p> <p>Find broken links is migrated to Browser &gt; Find broken links package. Additionally, 10.x/11.x has the "Find broken links timeout" and "Find broken links" options within the Tools &gt; 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.</p> <p>Download files is migrated to Browser &gt; Download files package.</p> <p>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.</p>
Window Action	All commands of Window Action are migrated to its equivalent actions of the Window package in A2019.

Package	How it is migrated to A2019	
	See <a href="#">Window package</a> .	
	All commands of XML are migrated to its equivalent actions of the XML package in A2019. The following command name have changed.	
XML	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
	See <a href="#">XML package</a> .	

## 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.	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
	<p>Sub-type "Read from text file"</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Open action from the CSV/TXT package, which opens the file for reading</li> <li>• Read action from the CSV/TXT package, which returns the value in the Table variable</li> <li>• Close action from the CSV/TXT package, which closes the file</li> </ul> <p>Sub-type "Read from database"</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Add the Connect action of the Database package with the respective connection string.</li> <li>• Add the Export to datatable action of the Database package to return the results to the datatable variable.</li> <li>• Add the Disconnect action of the Database package to disconnect the database.</li> </ul> <p>Sub-type "Read from Excel/CSV file"</p> <p>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:</p> <ul style="list-style-type: none"> <li>• Open action from the Advance Excel package, which opens the file for reading</li> <li>• 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</li> <li>• 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</li> <li>• Read column action from the Advance Excel package, which returns the Table variable if the Entire Column option is chosen in the variable declaration.</li> </ul> <p>Additionally, the Assign list to datatable of list package is used to store the returned valued to the variable.</p>	

Legacy Variable Type	How it is migrated to A2019	What you need to do
	<ul style="list-style-type: none"> <li>Close action from the Advance Excel package, which closes the file.</li> </ul> <p>Additional comments</p> <ul style="list-style-type: none"> <li>The index position starts with 1 in legacy. For example, \$arrayVariable(1,1)\$ becomes \$arrayVariable[0][0]\$</li> <li>If an array has 10 rows/columns and a loop is running more than 10 times, then 10.x/11.x returns the name of the array variable with the index position. In A2019, users get a runtime error indicating "index is out of bounds" and must fix the bot.</li> </ul> <p>When the system passes an Array 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[]</p> <p>Additionally, 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</p> <p>The DLL function also accepts the following as input types: List&lt;UInt16&gt;, List&lt;Int16&gt;, List&lt;Int32&gt;, List&lt;Int64&gt;, List&lt;Int&gt;, List&lt;Char&gt;, List&lt;Single&gt;, List&lt;Decimal&gt;, List&lt;Float&gt;, List&lt;Double&gt;, List&lt;Boolean&gt;, List&lt;bool&gt;, List&lt;Byte&gt;, List&lt;String&gt;, List&lt;Date-Time&gt;</p> <p>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[]</p> <p><a href="#">Database package</a>.</p>	
Dictionary	<p>Sub-type Value</p> <p>The system migrates these variables to the Dictionary type with the String sub-type in A2019.</p> <p>Sub-type "Read from CSV file"</p> <p>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</p>	No action required from users

Legacy Variable Type	How it is migrated to A2019	What you need to do
	<p>variable and uses the Put action of the Dictionary package to add the key and values in the Dictionary variable.</p> <p>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.</p> <p>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</p>	
List	<p>Sub-type Value</p> <p>These variables are migrated to List with sub-type String.</p> <p>Sub-type Array</p> <p>These variables are migrated to List with sub-type String.</p> <p>Sub-type Reading from text file</p> <p>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.</p> <p>Declared as "Make Random"</p> <p>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.</p> <p>Additional comments</p> <ul style="list-style-type: none"> <li>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:</li> </ul> <pre>\$listVariable[0]\$</pre> <p>where 0 represents the first value in the list.</p>	<p>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.</p>

Legacy Variable Type	How it is migrated to A2019	What you need to do
	<ul style="list-style-type: none"> <li>Index position starts from 1 in 10.x/11.x, whereas it starts with 0 in A2019.</li> <li>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 10<sup>th</sup> iteration. In A2019, you get a runtime error indicating that "index is out of bounds" and you must fix the bot.</li> </ul> <p>When the system passes a List 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[]</p> <p>Additionally, 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</p> <p>The DLL function also accepts the following as input types: List&lt;UInt16&gt;, List&lt;Int16&gt;, List&lt;Int32&gt;, List&lt;Int64&gt;, List&lt;Int&gt;, List&lt;Char&gt;, List&lt;Single&gt;, List&lt;Decimal&gt;, List&lt;Float&gt;, List&lt;Double&gt;, List&lt;Boolean&gt;, List&lt;bool&gt;, List&lt;Byte&gt;, List&lt;String&gt;, List&lt;Date-Time&gt;</p> <p>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[]</p> <p><a href="#">List package</a></p>	
Random	<p>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.</p> <p>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.</p>	No action required by users
Value	<p>Sub-type Value</p> <p>These variables always migrate as String in A2019, even if it has number, boolean, or datetime values in it. Expression</p>	No action required by users

Legacy Variable Type	How it is migrated to A2019	What you need to do
	<p>are used in A2019 to convert a string to other types if required.</p> <p>Sub-type Read from text file</p> <p>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.</p> <p><a href="#">String package</a></p> <p><a href="#">Number package</a></p> <p><a href="#">Boolean package</a></p> <p><a href="#">Datetime package</a></p>	

## 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

System Variable	How it is migrated to A2019	What you need to do
\$Month\$	Becomes \$System:Month\$ in A2019	No action required by user
\$Year\$	Becomes \$System:Year\$ in A2019	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.  <a href="#">Loop package</a> .	No action required by user
\$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 retrieved with the respective keys.  <a href="#">Using dictionary variable for email properties</a>	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

System Variable	How it is migrated to A2019	What you need to do
\$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.	No action required by user
\$ArrayColumns(\$arrayVariable\$\$)	Becomes an expression in A2019: \$arrayVariable.DataTable:columnCount\$	No action required by user
\$ArrayRows(\$arrayVariable\$\$)	Becomes an expression in A2019: \$arrayVariable.DataTable:rowCount\$	No action required by user
\$AAControlRoom\$	Becomes \$System:AAControlRoom\$ in A2019	No action required by user
\$RAMUsage\$	Becomes \$System:RAMUsage\$ in A2019	No action required by user
\$TotalRAM\$	Becomes \$System:TotalRAM\$ 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 \$System:OSName\$ and returns the Windows 10 64-bit.	No action required by user
\$CPUUsage\$	Becomes \$System:CPUUsage\$ 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
\$Excel Cell Column\$	<p>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.</p> <p>10.x/11.x returns the first column (for example column A) for the \$Excel Cell Column\$ 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:</p> <ul style="list-style-type: none"> <li>• Excel is opened with or without "contains header" checked containing 10 rows.</li> <li>• Set active cell as F10</li> <li>• A loop is performed to row read</li> <li>• Put a Message Box with \$Excel Cell Column\$ in it</li> <li>• Run the bot</li> </ul>	Considering the behavior difference you might need to change some bot configurations.
\$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	<p>This system variable becomes \$System.AATaskName\$ in A2019.</p> <p>In 10.x/11.x, this variable returns the value to your computer path directory (for example Automation Anywhere\My Tasks\My Folder\My Task).</p>	Considering the values returned are different between the versions.

System Variable	How it is migrated to A2019	What you need to do
	Folder2\AATaskName.atmx). In 11.x, it returns the value to the bot path relative to the Enterprise Control Room (for example Bots/AATaskName).	You might need to change some bot paths.
\$AAApplicationPath\$	<p>11.x specific: This 11.x system variable returns the path set by users in the Tool &gt; 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.</p> <p>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.</p> <p>See <a href="#">Global values</a>.</p>	<p>No action required by the user for 11.x because the system variable is automatically mapped to a global value during migration.</p> <p>10.x users must create the AAApplicationPath global value in A2019 after migration.</p> <p>Ensure that the Client 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 bot.</p>
\$AAInstallationPath\$	<p>This system variable becomes \$System:AAInstallationPath\$ in A2019.</p> <p>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).</p>	<p>Considering the values returned are different between the versions, you might need to change some bot paths.</p>
\$Date\$	<p>This system variable becomes \$System:Date\$ in A2019.</p> <p>In 10.x/11.x, this variable returns the current date and time in a format specified in the AA.Settings.XML file. In A2019, \$System:Date\$ returns values of type Datetime and users must use an action to change it to String. To minimize disruption to users, the migration process does the following to each \$Date\$ instance:</p> <ul style="list-style-type: none"> <li>Creates a temp variable \$SystemDateInString\$ of type String.</li> <li>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.</li> <li>Uses this string variable wherever \$Date\$ is used.</li> </ul>	<p>Change the bot instance. The date format is now "MM/dd/yyyy HH:mm:ss".</p>

System Variable	How it is migrated to A2019	What you need to do
	<ul style="list-style-type: none"> <li>The above steps are repeated for each occurrence of \$Date\$.</li> </ul> <p>Depending on how your bot is configured, you might need to update the date/time configuration.</p>	
\$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
\$PDFFFileName\$ \$PDFTitle\$ \$PDFAuthor\$ \$PDFSubject\$	<p>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 retrieved with the respective keys. Every PDF action returns this Dictionary variable with corresponding PDF values.</p> <p><a href="#">Using a dictionary variable for PDF properties</a></p>	No action required by user
\$WorkItem\$	<p>\$WorkItem\$ is String Migrated as is.</p> <p>\$WorkItem\$ is Number  <ul style="list-style-type: none"> <li>If it is displaying or logging a Number, the number is changed to a String</li> <li>If it is displaying as a Number, migrate as a Number type</li> </ul> </p> <p>\$WorkItem\$ is DateTime Migrate as is, but the migrated package results in an error, so you cannot migrate the package.</p>	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](#).

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	<ul style="list-style-type: none"> <li>• Create and Modify User</li> <li>• Create and Modify Group</li> <li>• Create and Modify Object</li> <li>• Search</li> <li>• Get Property</li> </ul>
Database	<ul style="list-style-type: none"> <li>• Connect with connection string</li> <li>• Username</li> <li>• Password</li> </ul>
Email Automation	<ul style="list-style-type: none"> <li>• Hostname</li> <li>• Username</li> <li>• Password</li> </ul>
Excel	Open Spreadsheet
FTP / SFTP	Connect
Insert Keystrokes	All keystrokes that require use of credentials
Legacy Automation	Set Text in Manage Web Controls action
Manage Window Controls	<ul style="list-style-type: none"> <li>• Set Text</li> <li>• Append Text</li> </ul>
PDF	<ul style="list-style-type: none"> <li>• PDF to Image</li> <li>• Extract Form Fields</li> <li>• Extract Text</li> <li>• Split, Encrypt, and Decrypt Document</li> </ul>
PGP	<ul style="list-style-type: none"> <li>• Encrypt and Decrypt Files</li> <li>• Create Keys</li> </ul>
Recorder	<ul style="list-style-type: none"> <li>• Set Text</li> </ul>

Package	Actions
	<ul style="list-style-type: none"> <li>Append Text</li> </ul> <p>Note: Migrated from Object Cloning command as Capture action.</p>
REST Web Service	<ul style="list-style-type: none"> <li>URI</li> <li>Username</li> <li>Password</li> <li>Headers</li> <li>Operation parameters</li> </ul> <p>Note: Domain name is migrated as a global value.</p>
SOAP Web Service	<ul style="list-style-type: none"> <li>Username</li> <li>Password</li> <li>Headers</li> <li>Operation parameters</li> <li>Raw data parameters</li> </ul>
Terminal Emulator	<ul style="list-style-type: none"> <li>Connect command for SSH2 with User and Key file authentication options</li> <li>Send Text</li> <li>Set Field</li> </ul>
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.

### Prerequisites

Ensure you complete the preparatory tasks listed in Steps 1 and 2 in the Upgrade to Enterprise A2019 procedure. [Upgrade to Enterprise A2019](#)

### Procedure

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.

2. Install the Bot agent on the device that you want to use for migration.

[Install Bot agent and register device](#)

## Next steps

For 10.x: [Copy 10.x data](#)

For 11.x: [Migrate Enterprise bots](#)

## 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.

## Prerequisites

Ensure you have completed all the prerequisite tasks for migrating bots. [Prerequisite tasks for migrating bots](#)

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.

## Procedure

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.  
Only users with the Autologin Set status and Allow a bot-runner user to run migrations permission are available for selection.  
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 the MessageBox.atmx and MetaTask.mbot.

Type	Name	Path
MetaBot (mbot)	MetaTask.mbot	Bots\My Metabots \MetaTask.mbot
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 Migrate Bots option from the Migrate Bots menu.

After a 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.

The All migrations page shows the current status of the migrated bot and other related information. You can also click the View migration icon associated with 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.

Note: Bots that are not migrated successfully are not uploaded to the Enterprise Control Room.

## Next steps

[Verify the bot migration](#)

Related tasks

[Migration reports](#)

### 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 assets

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 Binaary.dll is stored in the DLL subfolder.

Important: Migration of MetaBots with screens to A2019 is not supported.

## 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
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.

## 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[])
Array	Two-dimensional array, List

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), byte in array (Byte[]), and unsigned integers in array (UInt16[])
Array	Two-dimensional array, list, byte, unsigned integers (UInt16), byte in array (Byte[]), and unsigned integers in array (UInt16[])
Value	Byte, unsigned integers (UInt16)
Dictionary	Byte, unsigned integers (UInt16)

## 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.

## Procedure

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](#)
3. Edit the schedule to add relevant devices.  
[Schedule a bot](#)
4. Enable the schedule by clicking Enable after you have provided the required information for scheduling a bot.  
[Schedule a bot](#)

## Related concepts

[Upgrade to Enterprise A2019](#)[Related tasks](#)[Copy 10.x data](#)[Copy and paste 11.x information to A2019](#)[Migrate Enterprise bots](#)

## 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.

### Procedure

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](#)

## Migration reports

Use the reports to analyze the status of individual bot migrations and identify any unsupported commands or attributes associated with the migrated bot and its dependencies. You must have the "View migration" permission to access these reports.

### Prerequisites

You must have the `View migration` permission to access these reports.

The migration reports provide information about bot migration and data migration. The bot migration refers to the conversion of 10.x or 11.x bots to A2019 and data migration refers to copying 10.x data to A2019.

### Procedure

Access the reports from the Administration > Migrations > View migration icon associated with the migration instance for which you want to view the report.

- For 10.x and 11.x: View the following information bot migration:
  - 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.
- For 10.x only: View the following information for data migration:
  - Migration details such as about 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.

## 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.

## Procedure

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.

## 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.

### Prerequisites

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](#)

- Get access to A2019 Community Edition.
- Register a device in A2019 Community Edition to run bots.

[Install Bot agent and register device](#)

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}}.

### Procedure

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

[Use Bot Scanner](#)

Related reference

[Bot migration package](#)

# Build

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This collection of topics will get you started automating tasks and processes as quickly as possible.

- [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.

- [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.

- [Examples of building bots](#)

Use these example tasks to become familiar with the features and learn to build bots in Enterprise A2019.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [Troubleshooting and debugging](#)

Troubleshooting and debugging information.

Related reference

[Actions palette content for bot creation](#)

[Variables overview](#)

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.
  - 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:

Get started with the Bot editor

- [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.

- [Universal Recorder overview](#)

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.

- [AI-Sense for recording tasks from remote applications](#)

AI-Sense 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.

- [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

- [Keyboard shortcuts](#)

List of keyboard shortcuts supported.

- [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.

- [Bot dependencies](#)

Bots dependencies are files and other bots that are required to run that bot successfully.

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Related tasks

[Run a bot](#)

Related reference

[Editing bots](#)

## 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](#). Developers can learn more about creating packages in [Package Software Development Kit \(SDK\)](#).

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](#).

### 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](#)

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.

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#### 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:

#### Using actions

- [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.

- [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.

- [App Integration package](#)

Use the actions in the App Integration package to extract text from a window and save it to 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.

- [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.

- [Boolean package](#)

The Boolean package contains actions that enable you to do various operations on Boolean values.

- [Bot migration package](#)

The Bot migration package contains the Migrate bot action that enables you to migrate a bot (TaskBots and MetaBots) from 11.x to A2019.

- [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, and Google Chrome browsers.

- [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.

- [Comment package](#)

Use the Comment package to insert a user-specified comment into your bot logic.

- [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.

- [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.

- [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.

- [Datetime package](#)

A datetime value consists of a date, time, and time zone. Automation Anywhere 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.

- [Delay package](#)

Use the Delay package to add a timed delay to the logic.

- [Dictionary package](#)

The Dictionary package contains actions that enable you to do various operations on dictionary-type values.

- [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 call functions from the bot.

- [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.

- [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.

- [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.

- [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.

- [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.

- [Folder package](#)

The Folder package contains actions that enable you to automate folder-related operations.

- [FTP / SFTP package](#)

Use the FTP / SFTP package to automate FTP / SFTP operations.

- [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.

- [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.

- [Google Calendar package](#)

The Google Calendar package contains actions that enable you to automate creating and deleting events.

- [Google Drive package](#)

The Google Drive package contains actions that enable you to automate tasks related to files and folders.

- [Google Sheets package](#)

The Google Sheets package contains actions that enable you to automate tasks involving cells, columns, rows, and sheets.

- [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.

- [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).

- [If package](#)

Use the actions in the If package to control the sequence of execution based on one or more conditions of a task.

- [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.

- [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.

- [IQ Bot \(Preview\) package](#)

Use the IQ Bot (Preview) package to process and validate documents using IQ Bot with Auto-extraction.

- [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.

- [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.

- [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.

- [IQ Bot package](#)

The IQ Bot package enables you to upload and download documents from an IQ Bot server.

- [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.

- [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.

- [List package](#)

The List package contains actions that enable you to perform various operations on a variable of the list data type.

- [Log To File package](#)

Use the Log To File package to create a log file with data.

- [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.

- [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`.

- [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.

- [Mouse package](#)

Use the Mouse package to simulate mouse actions.

- [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.

- [OCR package](#)

The OCR package contains actions that enable you to extract text from images or applications.

- [Office 365 Calendar package](#)

The Office 365 Calendar package contains actions that enable you to automate meeting-related tasks in Office 365 Calendar.

- [Office 365 Excel package](#)

The Office 365 Excel package contains actions that enable you to automate tasks in the online version of Microsoft Excel.

- [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.

- [PDF package](#)

Use the PDF package to automate various operations on a PDF file.

- [PGP package](#)

Use the PGP (Pretty Good Privacy) package to automatically encrypt and decrypt files for security.

- [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.

- [Printer package](#)

Use the actions in the Printer package to automate retrieving and setting 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.

- [Prompt package](#)

Use the Prompt package to accept an input value, a yes/no response, or to open a file or folder.

- [Python Script package](#)

The Python Script package contains actions that enable Python Script functions in a task.

- [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.

- [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.

- [SAP package](#)

The SAP package contains actions to automate tasks and processes on a SAP application.

- [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.

- [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.

- [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.

- [SNMP package](#)

The SNMP package allows you to automate network management tasks, such as retrieving and modifying data, and sending notification messages.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [VBScript package](#)

The VBScript package contains actions that enable VBScript functions in a task.

- [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.

- [Window package](#)

Use the Window package to automate tasks relating to the window.

- [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.

- [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.

Related reference

[Bot editor for creating bots](#)

## 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](#)
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 <a href="#">Computer operations</a> .
Group operations	See <a href="#">Group operations</a> .
LDAP operations	See <a href="#">LDAP operations</a> .
Organizational unit operations	See <a href="#">Organizational unit operations</a> .
User account operations	See <a href="#">User account operations</a> .

## 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	<p>Creates a new object for the computer.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter a name for the computer.</li> <li>• Optional: Enter a description of the computer.</li> </ul>
Delete computer	<p>Deletes an existing computer.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter a name for the computer.</li> </ul>
Get computer property	<p>Retrieves a specific property value for a computer.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter the computer name.</li> <li>• Enter the property.</li> <li>• Assign the value to a string variable.</li> </ul>
Rename computer	<p>Renames an existing computer.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter a name for the computer.</li> <li>• Enter a new name for the computer.</li> </ul>
Set computer property	<p>Assigns a value to a computer property.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter the computer name.</li> <li>• Enter the property to update.</li> <li>• Enter the new value.</li> </ul>

## 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	<p>Creates a new group.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter a unique name for the group.</li> <li>Optional: Enter a description for the group.</li> <li>Select the group scope from the following options:           <ul style="list-style-type: none"> <li>Domain Local</li> <li>Global</li> <li>Universal</li> </ul> </li> </ul> <p><a href="#">Group scope</a></p> <ul style="list-style-type: none"> <li>Select the group type from the following options:           <ul style="list-style-type: none"> <li>Security: Provides users with access rights to folders.</li> <li>Distribution: Sends emails to a group of users.</li> </ul> </li> </ul>
Delete group	<p>Deletes an existing group.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the name of the group to delete.</li> </ul>
Get group property	<p>Retrieves a specific property value for the group.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the group name.</li> <li>Enter the property.</li> <li>Assign the value to a string variable.</li> </ul>
Rename group	<p>Renames an existing group.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the group name.</li> <li>Enter a new name for the group.</li> </ul>
Set group property	<p>Assigns a value to a group property.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the group name.</li> <li>Enter the property to update.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Enter the new value.</li> </ul>

## 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	<a href="#">Using the Connect action</a>
Disconnect	Closes the connection with the LDAP server.
Run query	<p>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:</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Input the query. For example:  <code>(&amp;(objectCategory=person) (objectClass=user) (name=A*)</code> </li> <li>Specify the return type. Select either the Object Name or LDAP Path option.</li> <li>Assign the value to a string variable.</li> </ul>

## 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.

### Procedure

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. In the Parent path field, enter the LDAP URL that identifies the server holding the Active Directory services.  
For example, `LDAP://192.168.2.60/DC=corporate, DC=com`.
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](#)
  - Variable: Select a variable holding a credential data type value. [User-defined variables](#)
  - 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](#)
  - Variable: Select a variable holding a credential data type value. [User-defined variables](#)
  - 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	<p>Creates a new object for the organizational unit.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter a name for the organizational unit.</li> <li>• Optional: Enter a description of the organizational unit.</li> </ul>
Delete organizational unit	<p>Deletes an existing organizational unit.</p> <ul style="list-style-type: none"> <li>• Enter the same session name as the one you used in the Connect action.</li> <li>• Enter the name of the organizational unit to delete.</li> </ul>
Get organizational unit property	<p>Retrieves a specific property value for an organization and assigns the results to a variable.</p>

Action	Description
	<ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the organizational unit name.</li> <li>Enter the property.</li> <li>Assign the retrieved value to a string variable.</li> </ul>
Rename organizational unit	<p>Renames an existing organizational unit.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the name of the organizational unit to rename.</li> <li>Enter the new name.</li> </ul>
Set organizational unit property	<p>Assigns a value to an organizational property.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the organizational unit name.</li> <li>Enter the property to update.</li> <li>Enter the new value.</li> </ul>

## 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
Create user	See <a href="#">Using the Create user action</a> .
Delete user	<p>Deletes the user.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Select whether to search for the user by User name or Logon name.</li> </ul>
Disable user account	<p>Disables a user account.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Select whether to search for the user by User name or Logon name.</li> </ul>
Enable user account	<p>Enables a user account.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Select whether to search for the user by User name or Logon name.</li> </ul>
Get all users of a group	<p>Retrieves a list of all the users of a group, and assigns the results to a variable.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Enter the group name.</li> <li>Specify the return type. Select either the Object Name or LDAP Path option.</li> <li>Assign the value to a string variable.</li> </ul>
Get user property	<p>Retrieves a specific property value for a user and assigns the results to a variable.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Select whether to search for the user by User name or Logon name.</li> <li>Enter the property.</li> <li>Assign value to a string variable.</li> </ul>
Rename user	<p>Renames the user logon name or the user account name.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Select whether to search for the user by User name or Logon name.</li> <li>Enter the name to search for.</li> <li>In the New name field, enter the updated name.</li> <li>Select from the following options to specify what to update:           <ul style="list-style-type: none"> <li>Rename user name</li> <li>Rename logon name</li> <li>Rename user and logon name</li> </ul> </li> </ul>
Set user property	<p>Enables you to assign a value to a user property, view the current details, and update it.</p> <ul style="list-style-type: none"> <li>Enter the same session name as the one you used in the Connect action.</li> <li>Select whether to search for the user by User name or Logon name.</li> <li>Enter the property to update.</li> <li>Enter the new value.</li> </ul>

Action	Description
Update user details	See <a href="#">Using the Update user details action</a>

## Using the Create user action

Use the Create user action to configure and activate a new user.

### Prerequisites

Connect to the Active Directory server.

#### [Using the Connect action](#)

### Procedure

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 Update user details action

Use this action to update the details of a user.

### Prerequisites

Connect to the Active Directory server.

#### [Using the Connect action](#)

## Procedure

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	<p>Closes the transaction.</p> <ul style="list-style-type: none"> <li>• In the Transaction name field, enter the transaction name that you provided in the Open action.</li> <li>• In the Dictionary variable, select the following options:           <ul style="list-style-type: none"> <li>• All user-defined variables: Include all the string, numeric, and date time user-defined variables from the bot to populate the Bot Insight dashboards.</li> <li>• Manually select which variables to include in the Bot Insight dashboards.</li> </ul> </li> </ul>
Open	<p>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.</p>

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](#).

## 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](#).

## 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](#)

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](#)

## Actions in the App Integration package

The App Integration package includes the following actions:

Action	Description
Capture text of window	Extracts all the text from a window and saves it to 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	<p>Opens an application or file.</p> <ul style="list-style-type: none"> <li>• Enter the name of the application or file, or insert a variable. For example, chrome.exe. Note: You can also enter the full file path in this field.</li> <li>• Optional: Enter the location of the file that you want to use to open the application in the Start in path field.</li> </ul>

Action	Description
	<p>For example, C:\Program Files (x86)\Google\Chrome\Application\</p> <ul style="list-style-type: none"> <li>Optional: In the Parameters field, specify the parameters or arguments you want to pass to the program.</li> </ul> <p>For example, if you are using the command line, enter the arguments in this field.</p>

## 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 <a href="#">Detect the Dominant Language</a> .
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.

Action	Description
Get sentiment	<p>Analyzes the provided content and returns the overall sentiment and scores for all possible sentiments. An example output of the dictionary values:</p> <pre>POSITIVE {Positive: 0.66238534, Negative: 0.0013064129, Neutral: 0.33621928, Mixed: 8.892125E-5}</pre> <p>The output is stored in a dictionary variable containing two keys and their corresponding values: <code>sentiment</code> and <code>score</code>.</p>

## 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	<p>Assigns a constant value (True or False) or a user-defined value to a Boolean value.</p> <ul style="list-style-type: none"> <li>Select the source Boolean variable or value.</li> <li>Select the variable to use to store the output from the Destination Boolean variable list.</li> </ul> <p>The output is stored in a Boolean variable.</p>
Compare to	<p>Compares two Boolean values and assigns the output to a numeric variable.</p> <ul style="list-style-type: none"> <li>Select the Boolean variables to compare from the Select the first Boolean variable and Select the second Boolean variable lists.</li> <li>Select the variable to use to store the output from the Assign the output to number variable list.</li> </ul> <p>The output is stored in a number variable.</p>
Equal to	Verifies whether the two Boolean values are equal or not, and assigns the output to a Boolean variable.

Action	Description
	<ul style="list-style-type: none"> <li>Select the variables that contain the Boolean values to verify from the Select the first Boolean variable and Select the second Boolean variable lists.</li> <li>Select the variable to use to store the output from the Assign the output to number variable list.</li> </ul> <p>The output is stored in a number variable.</p>
Invert	<p>Converts a Boolean value to the opposite value (True to False and False to True), and assigns the output to a variable.</p> <ul style="list-style-type: none"> <li>Select the Boolean value to convert. Choose from False, True, or a Variable.</li> <li>Select the numeric variable to use to store the converted value from the Assign the output to variable list.</li> </ul>
To number	<p>Converts a Boolean value to a numeric value. This action converts True to 1 and False to 0.</p> <ul style="list-style-type: none"> <li>Select the Boolean variable to convert from the Select Boolean variable list.</li> <li>Select the numeric variable to use to store the converted value from the Assign the output to variable list.</li> </ul>
To string	<p>Converts a Boolean value to a string value.</p> <ul style="list-style-type: none"> <li>Select the Boolean variable to convert from the Select Boolean variable list.</li> <li>Select the string variable to use to store the converted value from the Select the string variable to store the result list.</li> </ul>

## 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 11.x to A2019.

[View certified 11.x versions](#)

## Action in the Bot migration package

The Bot migration package includes the following action:

Action	Description
Migrate bot	<p>Migrates the version 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.</p> <ul style="list-style-type: none"> <li>• Use the Control Room file, Desktop file, or Variable tab to specify the location of the bot you want to migrate.</li> <li>• In the Output folder path field, specify the location available on the Enterprise A2019 Enterprise Control Room where you want to save the bot file that is migrated to A2019 format.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• Select the Overwrite the file if exists check box to overwrite an existing bot file.</li> </ul>

## 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, and Google Chrome browsers.

### Actions in the Browser package

The Browser package includes the following actions:

Action	Description
Download files	<p>Downloads and saves files from URLs.</p> <ul style="list-style-type: none"> <li>Specify the URL of the file you want to download.</li> <li>In the Save to location field, enter the location where you want to save the file.</li> </ul>
Find broken links	See <a href="#">Using Find broken links action</a> .
Launch website	<p>Launches the browser.</p> <ul style="list-style-type: none"> <li>In the URL field, specify the website you want to open.</li> <li>Select your browser from Default Browser, Internet Explorer, or Google Chrome.</li> </ul> <p>Note: Ensure that Internet Explorer or Google Chrome is set as the default browser. If any browser that is not listed is set as the default browser for the device, the bot might encounter an error. When using commands such as OCR and Image Recognition, the browser must finish rendering before the commands execute.</p>

## 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.

### Procedure

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 Apply.

## 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](#).  
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](#).
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](#).

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](#).

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](#)

[User-defined variables](#)

## 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.

### Procedure

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 Apply.

## Next steps

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](#)
- [Using the For each row in CSV/TXT iterator](#)

## 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:

### Procedure

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.
4. Click Apply.

## Next steps

Perform operations with the values in the Table variable using the [Data Table package](#).

## 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	<p>Assigns values to a table variable. You can use this action to manually enter the table data.</p> <ul style="list-style-type: none"> <li>Select whether to create a table with or without values.             <ul style="list-style-type: none"> <li>If you select to create a table with values, either manually enter the values or select a source table variable.</li> <li>If you select to create a table without values, specify the number of rows and columns.</li> </ul> </li> <li>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.</li> </ul>
Clear content	<p>Clears the contents of the specified table variable. This action clears the content until the execution of the bot is completed. After the execution of the bot is completed, the original values of the table variables are restored.</p> <p>It enables you to reuse an existing table variable to store values that are used only during the execution of the bot.</p> <p>Note: The data type of the values must be same as the data type of the columns in the table variable.</p>
Delete column	<p>Deletes a specific column.</p> <ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Specify the column name or column index to delete.</li> </ul> <p>Note: The index count starts from 0.</p>
Delete row	<p>Deletes a specific row.</p> <ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Specify the row name or row index to delete.</li> </ul> <p>Note: The index count starts from 0.</p>
Get number of columns	<p>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.</p>

Action	Description
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	<p>Inserts a column from one table to another table.</p> <p>For destination table:</p> <ul style="list-style-type: none"> <li>Select the destination table variable form the Enter into data table list.</li> <li>Select where to insert the column: first index, last index, or enter the column index number.</li> </ul> <p>Note: The index count starts from 0.</p> <p>For source table:</p> <ul style="list-style-type: none"> <li>Select the source table variable from the Insert from table list.</li> <li>Enter the name or index number of the column to insert.</li> </ul>
Insert row	<p>Inserts a row into the table.</p> <ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Select where to insert the row: first index, last index, or enter the row index number.</li> </ul> <p>Note: The index count starts from 0.</p>
Join	<p>See <a href="#">Using Join action</a>.</p> <p>Use the <a href="#">Join type output examples</a> to help you decide whether to use the Join or Merge action.</p> <p>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 re-insert the action and repopulate the fields.</p>
Merge	<p>See <a href="#">Using the Merge action</a>.</p> <p>Use the <a href="#">Merge output example</a> to help you decide whether to use the Join or Merge action.</p> <p>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 re-insert the action and repopulate the fields.</p>
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.

Action	Description
	<ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Enter the value to search for.</li> <li>Select Match case to ensure the case matches the value searched.</li> </ul>
Set cell value	<p>Updates the value of a specific cell.</p> <ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Enter the row index. For example, to set a value to the first row, enter 0</li> <li>Select whether to specify the column by Name or Index.           <ul style="list-style-type: none"> <li>If you select to specify by name, enter the column name. Capitalization is not important.</li> <li>If you select to specify by index, enter the column index. For example, to set a value to the first column, enter 0</li> </ul> </li> <li>Enter the value to set.</li> </ul>
Sort	<p>Sorts the table data by a column. This action enables you to sort numeric and text data.</p> <ul style="list-style-type: none"> <li>Select the Table variable name from the drop-down list.</li> <li>Specify the column name or column index to sort by.</li> <li>Select the order in which to sort: ascending or descending.</li> </ul> <p>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 re-insert the action and repopulate the fields.</p>
Write to file	See <a href="#">Using Write to file action</a> .

Example: [Example of extracting data from a web table](#)

## 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:

### Procedure

- Double-click or drag Data table > Join.
- 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](#).
  - 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	
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.

### Procedure

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 Apply.

For more information, see [Merge output example](#).

## 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	

employee	department	pay rate	salary
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:

### Procedure

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.
  - ANSI
  - Unicode
  - UTF-8
  - 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](#).

2. Choose from the following:

- Use the Read from action to retrieve records from the database. [Using the Read from action](#)
- 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	<p>Starts a database transaction.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.</p>
Connect	See <a href="#">Using Connect action for database</a> .
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 <a href="#">Using the Export to data table action</a> .
Insert/Update/Delete	<p>Executes an INSERT, UPDATE, or DELETE statement from the database.</p> <ul style="list-style-type: none"> <li>• In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>In the Statement field, enter the SQL statement to insert, update, or delete the records.</li> <li>Use an INSERT statement to create new records in a table:</li> </ul> <pre>INSERT INTO table_name (column1, column2, column3, ...) VALUES (value1, value2, value3, ...);</pre> <ul style="list-style-type: none"> <li>Use an UPDATE statement to modify a record:</li> </ul> <pre>UPDATE table_name SET column1 = value1, column2 = value2, ... WHERE condition;</pre> <ul style="list-style-type: none"> <li>Use a DELETE statement to remove a record:</li> </ul> <pre>DELETE FROM table_name WHERE condition;</pre> <ul style="list-style-type: none"> <li>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.</li> </ul>
Manage stored procedure	<p>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.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the database server in the Connect action.</li> <li>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.</li> </ul> <p>Recommended: Declare a delimiter and use it to close the SQL statement.</p> <p>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:</p> <pre>DROP PROCEDURE IF EXISTS sum_of_two; DELIMITER \$\$  CREATE PROCEDURE sum_of_two(IN num1 INT, IN num2 INT, OUT sum INT)</pre>

Action	Description
	<pre> BEGIN     SET sum := num1 + num2; END \$\$ </pre> <ul style="list-style-type: none"> <li>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.</li> </ul>
Read from	See <a href="#">Using the Read from action</a> .
Run stored procedure	See <a href="#">Using the Run stored procedure action</a> .

Related reference

[Loop package](#)

[Variables overview](#)

## 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.

### Procedure

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	<ul style="list-style-type: none"> <li>• Server name: Enter the name of the database server you want to connect to.</li> <li>• Database name: Enter the database name.</li> <li>• 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.</li> <li>• Password: Enter the password for the username you have provided. To ensure a secure password, select a Credential Vault variable. Otherwise, enter a value.</li> <li>• Instance name: Enter a name for this connection instance.</li> </ul> <p><a href="#">Connect to a Microsoft SQL Server with Windows authentication</a></p>
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: <ul style="list-style-type: none"> <li>• My bots folder</li> <li>• local device</li> <li>• existing file variable</li> </ul>
Oracle	<ul style="list-style-type: none"> <li>• Server name: Enter the name of the Oracle server you want to connect to.</li> <li>• Oracle system id (sid): Enter the system ID.</li> <li>• 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.</li> <li>• Password: Enter the password for the username you have provided. To ensure a secure password, select a Credential Vault variable. Otherwise, enter a value.</li> <li>• Port: Enter the port number. The default port number is 1521.</li> </ul>

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 Apply.
6. Click Save.

## Next steps

Choose from the following:

- Use the Read from action to retrieve records from the database.

#### Using the Read from action

- 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

## 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.

### Procedure

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 .dll file in the auth\x64 folder and rename it to sqljdbc\_auth.dll.
4. Copy the sqljdbc\_auth.dll file to the following file paths:
  - C:\Windows\System32
  - C:\Program Files\Automation Anywhere\Bot Agent\jre\binThis 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 Apply.
10. Click Save.

### Next steps

Choose from the following:

- Use the Read from action to retrieve records from the database.

#### [Using the Read from action](#)

- 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](#)

## 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.

### Procedure

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	<p>Parameter is passed from the bot to the stored procedure.</p> <ul style="list-style-type: none"> <li>• 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></li> <li>• Value (optional): Enter a value or select a variable.</li> <li>• Type: Select the data type from the following options <ul style="list-style-type: none"> <li>• BIGINT (number)</li> <li>• BINARY (Boolean)</li> <li>• BIT (number)</li> <li>• CHAR (string)</li> <li>• DATE (date time)</li> </ul> </li> </ul>

Option	Steps
	<p>Supported format yyyy-mm-dd</p> <ul style="list-style-type: none"> <li>• DECIMAL (number)</li> <li>• DOUBLE (number)</li> </ul> <p>Default choice for decimal values.</p> <ul style="list-style-type: none"> <li>• FLOAT (number)</li> <li>• INTEGER (number)</li> </ul> <p>Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647</p> <ul style="list-style-type: none"> <li>• LONGVARBINARY (Boolean)</li> <li>• LONGVARCHAR (string)</li> <li>• NUMERIC (number)</li> <li>• REAL (number)</li> <li>• SMALLINT (number)</li> </ul> <p>Uses 2 bytes to store an integer with a value from -32,768 to 32,767</p> <ul style="list-style-type: none"> <li>• TIME (date time)</li> </ul> <p>Supported format hh:mm:ss</p> <ul style="list-style-type: none"> <li>• TIMESTAMP (date time)</li> </ul> <p>Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds</p> <ul style="list-style-type: none"> <li>• TINYINT (number)</li> </ul> <p>Uses 1 byte to store an integer with a value from 0 to 255</p> <ul style="list-style-type: none"> <li>• VARBINARY (Boolean)</li> <li>• VARCHAR (string)</li> </ul> <p>For example, if running the example function from the Manage stored procedure action, configure the following two input parameters and values for the sum_of_two function to add:</p> <ul style="list-style-type: none"> <li>• Parameter 1: num1 ,, 5 ,, TINYINT</li> <li>• Parameter 2: num2 ,, 10 ,,</li> </ul>

Option	Steps
	<p><b>TINYINT</b></p>
Output	<p>Parameter is passed from the stored procedure to the bot.</p> <ul style="list-style-type: none"> <li>Name: Enter the name of the parameter from the stored procedure.</li> </ul> <p>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</p> <p><b>Input1</b></p> <ul style="list-style-type: none"> <li>Type: Select the data type from the following options <ul style="list-style-type: none"> <li>BIGINT (number)</li> <li>BINARY (Boolean)</li> <li>BIT (number)</li> <li>CHAR (string)</li> <li>DATE (date time)</li> </ul> <p>Supported format yyyy-mm-dd</p> <ul style="list-style-type: none"> <li>DECIMAL (number)</li> <li>DOUBLE (number)</li> </ul> <p>Default choice for decimal values.</p> <ul style="list-style-type: none"> <li>FLOAT (number)</li> <li>INTEGER (number)</li> </ul> <p>Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647</p> <ul style="list-style-type: none"> <li>LONGVARBINARY (Boolean)</li> <li>LONGVARCHAR (string)</li> <li>NUMERIC (number)</li> <li>REAL (number)</li> <li>SMALLINT (number)</li> </ul> <p>Uses 2 bytes to store an integer with a value from -32,768 to 32,767</p> <ul style="list-style-type: none"> <li>TIME (date time)</li> </ul> <p>Supported format hh:mm:ss</p> <ul style="list-style-type: none"> <li>TIMESTAMP (date time)</li> </ul> <p>Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds</p> <ul style="list-style-type: none"> <li>TINYINT (number)</li> </ul> </li> </ul>

Option	Steps
	<p>Uses 1 byte to store an integer with a value from 0 to 255</p> <ul style="list-style-type: none"> <li>• VARBINARY (Boolean)</li> <li>• VARCHAR (string)</li> </ul> <p>When the bot runs, the action converts the database data type to an Enterprise A2019-supported data type.</p> <p>For example, if running the example <code>sum_of_two</code> function from the Manage stored procedure action, configure the output parameter:</p> <pre>sum , TINYINT</pre> <p>.</p>
InputOutput	<p>Parameter can be used for both input and output.</p> <ul style="list-style-type: none"> <li>• 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></li> <li>• Value (optional): Enter a value or select a variable.</li> <li>• Type: Select the data type from the following options <ul style="list-style-type: none"> <li>• BIGINT (number)</li> <li>• BINARY (Boolean)</li> <li>• BIT (number)</li> <li>• CHAR (string)</li> <li>• DATE (date time)</li> </ul> <p>Supported format yyyy-mm-dd</p> <ul style="list-style-type: none"> <li>• DECIMAL (number)</li> <li>• DOUBLE (number)</li> </ul> <p>Default choice for decimal values.</p> <ul style="list-style-type: none"> <li>• FLOAT (number)</li> <li>• INTEGER (number)</li> </ul> <p>Uses 4 bytes to store an integer with a value from -2,147,483,648 to 2,147,483,647</p> <ul style="list-style-type: none"> <li>• LONGVARBINARY (Boolean)</li> <li>• LONGVARCHAR (string)</li> <li>• NUMERIC (number)</li> <li>• REAL (number)</li> <li>• SMALLINT (number)</li> </ul> </li> </ul>

Option	Steps
	<p>Uses 2 bytes to store an integer with a value from -32,768 to 32,767</p> <ul style="list-style-type: none"> <li>• TIME (date time)</li> </ul> <p>Supported format hh:mm:ss</p> <ul style="list-style-type: none"> <li>• TIMESTAMP (date time)</li> </ul> <p>Supported format yyyy-mm-dd hh:mm:ss.f, where f is fractional seconds</p> <ul style="list-style-type: none"> <li>• TINYINT (number)</li> </ul> <p>Uses 1 byte to store an integer with a value from 0 to 255</p> <ul style="list-style-type: none"> <li>• VARBINARY (Boolean)</li> <li>• VARCHAR (string)</li> </ul>

4. Enter the maximum number of records to retrieve.  
You can limit the results of the execution.
5. Optional: Enter a timeout value.  
When the specified time expires, the statement execution stops even if the execution is not completed.
6. 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 **Apply**.
9. Click **Save** to save the automation.

## 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.

### Procedure

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 **Apply**.
7. 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.

### Procedure

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.
- Select the file path from the My bots folder, the local device, or an existing file variable.
  - Select the CSV file encoding to be either ANSI, UNICODE, or UTF8.
  - 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

- Specify whether to overwrite the file or append the data to the existing file if a CSV file with the same name exists.

- Click Apply.
- 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.

### Prerequisites

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

### Procedure

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.
  - d) Click Apply.
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.
  - e) Click Apply.
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 ('$rExcelCurrentRow[0]$', '$rExcelCurrentRow[1]$', '$rExcelCurrentRow[2]$');
```

f) Click Apply.

5. Disconnect from the database:
  - a) Drag the Database > Disconnect action below the Loop container.
  - b) Click Save.
6. Close the spreadsheet:
  - a) Double-click or drag Excel advanced > Close Spreadsheet action.
  - b) Click Save.

#### Related reference

[Database package](#)

[Excel advanced package](#)

[Loop package](#)

#### Datetime package

A datetime value consists of a date, time, and time zone. Automation Anywhere 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 <a href="#">Using the Add action</a> .
Assign	See <a href="#">Using the Assign action</a> .
Is after	<p>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.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p>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.</p>
Is before	<p>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.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p>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.</p>
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.

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p>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.</p>
Subtract	See <a href="#">Using the Subtract action</a> .
To string	See <a href="#">Using the To string action</a> .

Related reference

[Date time formats](#)

## 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.

### Procedure

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 Apply.

## Next steps

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](#) and [Using the Message box action](#).

## 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.

### Procedure

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](#).
      - 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 Apply.

## 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.

### Procedure

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 Apply.

## Next steps

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](#) and [Using the Message box action](#).

## 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](#).

To convert a datetime value to string, do the following:

## Procedure

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 Apply.

## 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	<p>Adds a timed delay.</p> <ul style="list-style-type: none"> <li>• Select the delay type as Regular or Random.</li> <li>• Select the Regular option to delay the operation for a fixed period of time.</li> <li>• 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.</li> </ul> <p>You can add Random delay with different waiting time for each bot run at a given command level without having to change the bot.</p>

Action	Description
	<p>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.</p> <ul style="list-style-type: none"> <li>• Select the time units in seconds or milliseconds.</li> </ul>

Watch the following video on how to use the Delay actions:

### Using 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 and cannot contain a dollar sign (\$).
- Keys do not have leading or 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	<p>Assigns the value of the source dictionary to the destination dictionary variable.</p> <ul style="list-style-type: none"> <li>Select the source dictionary variable from the drop-down list or create a new dictionary variable.</li> <li>Select a variable or create one to hold the output.</li> </ul>
Get	<p>Verifies if a key exists in a dictionary variable and returns the corresponding value.</p> <ul style="list-style-type: none"> <li>Select the dictionary variable from the drop-down list.</li> <li>Enter the key name.</li> <li>Select a dictionary variable or create one to hold the output.</li> </ul>
Put	<p>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.</p> <ul style="list-style-type: none"> <li>Select the dictionary variable from the drop-down list.</li> <li>Enter the key name.</li> <li>Select the new value to associate with the key.</li> <li>Select the variable to hold the previous value.</li> </ul>
Remove	<p>Removes a value from the specified key. The removed value is assigned to a variable selected from the Assign removed item to variable list.</p> <p>Removes a value from the specified key and optionally assigns it to a variable selected from the Assign removed item to variable list.</p> <ul style="list-style-type: none"> <li>Select the dictionary variable from the drop-down list.</li> <li>Enter the key name.</li> <li>Select the variable to hold the removed value.</li> </ul>
Size	<p>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.</p>

## 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 call 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.
- Note: Windows and appropriate versions of Microsoft .NET Framework are available on the devices running the DLLs.

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

## 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. <ul style="list-style-type: none"> <li>• In the Session name field, enter the name of the session.</li> <li>• In the File path field, specify the location of the path.</li> </ul> <p>Note: The DLL package supports only DLLs written in C#.</p>
Run function (Legacy)	See <a href="#">Using the Run function action</a> . Note: This action is called Run function (Legacy) starting from Enterprise A2019.16. The action is called Run function in previous releases till Enterprise A2019.15.
Run function	See <a href="#">Using the Run function action</a> .

- [Using the Run function \(Legacy\) action](#)

Use the Run function (Legacy) action to run a function within the .dll file and specify the parameters to pass a function and store the output as a variable.

- [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.

# Using the Run function (Legacy) action

Use the Run function (Legacy) action to run a function within the .dll 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.
- The Run function (Legacy) 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](#)

## Procedure

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 Apply.
9. 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](#)

- 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](#)

## Procedure

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 Apply.
9. 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](#).

The Email package includes the following actions:

Action	Description
Change status	<p>Changes the statuses of emails to read or unread. Use this action within a Loop action.</p> <ul style="list-style-type: none"> <li>• In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Select the Read or Unread option to change the status of the email.</li> </ul> <p>Note: Microsoft Outlook does not yet support this action.</p>
Check if folder exists	<p>Checks whether a folder with the name you specified exists in the email server.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> <li>In the Folder name field, enter the name of the folder you want to check.</li> </ul> <p>Note: This field is not case sensitive.</p> <ul style="list-style-type: none"> <li>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).</li> </ul>
Connect	See <a href="#">Using the Connect action</a> .
Delete	<p>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.</p> <p>Note: Microsoft Outlook does not yet support this action.</p>
Delete all	<p>Deletes read, unread, or all emails from the mail server.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> <li>Select the All, Read, or Unread option to specify the type of email you want to delete.</li> </ul> <p>Note: For an email server using the POP3 protocol, this action deletes all the email messages.</p> <p>Note: Microsoft Outlook does not yet support this action.</p>
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 <a href="#">Using the Forward action</a> .
Move all	<p>Moves an email from one folder to another in the email server.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> <li>In the Destination folder path in mailbox field, provide the path to the location where you want to move the email.</li> <li>Select which emails to move: All, Read, or Unread.</li> <li>In the From a specific folder field, specify the folder from which to move the emails. For example,</li> </ul> <p style="background-color: #e0e0e0; padding: 2px;">Inbox/project1</p> <p>Note: For an email server using the POP3 protocol, you can retrieve only from the Inbox.</p>

Action	Description
	<ul style="list-style-type: none"> <li>Optional: Specify any of the following conditions:           <ul style="list-style-type: none"> <li>When subject contains: Enter keywords separated with a semi-colon.</li> </ul> </li> </ul> <p><a href="#">How subject filter works when moving emails</a></p> <ul style="list-style-type: none"> <li>From specific senders: Enter senders' email addresses separated with a semi-colon.</li> <li>When received date is on or after or When received date is before: Select a datetime variable from the list.</li> </ul> <p>Note: Because folders are not supported in Gmail, this action is not supported for Gmail.</p>
Reply	See <a href="#">Using Reply action</a> .
Save all attachments	<p>Saves attachments from all emails on the email server to a specified folder.</p> <p>Note: If connected to an Outlook server, images embedded in the emails are downloaded along with attachments.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> <li>Select which emails to save: All, Read, or Unread.</li> <li>In the Save attachments to folder field, specify the location to save the attachments.</li> </ul> <p>Note: This field is not case sensitive.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
Save attachments	<p>Saves attachments from one email to a specified folder. Use this action within a Loop action.</p> <p>Note: If connected to an Outlook server, images embedded in the emails are downloaded along with attachments.</p> <ul style="list-style-type: none"> <li>In the Save attachments to folder field, specify the location to save the attachments.</li> </ul> <p>Note: This field is not case sensitive.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
Save email	<p>Saves an email message as an EML file to a folder. Use this action within a Loop action.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the name of the session you used to connect to the email server in the Connect action.</li> <li>In the Save emails to folder field, specify the location to save the email.</li> </ul> <p>Note: This field is not case sensitive.</p>

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> </ul> <p>Note: Microsoft Outlook does not yet support this action.</p>
Send	See <a href="#">Using the Send action</a> .

## Related reference

[Loop package](#)[Configuring email server](#)[Using dictionary variable for email properties](#)

## 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.

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.

### Procedure

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](#).
    - 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 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

4. Click Apply.

5. 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 For POP3: Host: pop-mail.outlook.com Port: 993	Port: 465 or 587
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## 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.

### Procedure

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.

Option	Result
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](#).
    - 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 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

9. Click Apply.

10. 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.

### Procedure

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](#).

- 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 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

9. Click Apply.

10. 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](#).

## Procedure

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	<p>For information about the host and port to be used for the various mail servers, see <a href="#">Configuring email server</a>.</p> <ul style="list-style-type: none"> <li>• 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</li> </ul>

Option	Steps
	<p>address as provided in the Username field while configuring the mail server.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Email server port: Enter the port you want to use to establish the connection.</li> <li>• Use secure connection (SSL/TLS): Select True or False, or insert a Boolean variable.</li> <li>• My server requires authentication: Select True or False, or insert a Boolean variable. <ul style="list-style-type: none"> <li>• Username: Enter the username you want to use to access the mail server.</li> </ul> <p>Choose the username as a Credential or String.</p> <ul style="list-style-type: none"> <li>• Password: Enter the password for the username you have provided.</li> </ul> <p>Choose the password as a Credential or String.</p> </li> </ul>
EWS	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Password: Enter the password for the username you have provided.  Choose the username as a Credential or String.</li> <li>• Optional: Domain name: <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul> </li> <li>• Exchange Version: Select the version your organization is using: <ul style="list-style-type: none"> <li>• Exchange2010</li> <li>• Exchange2010_SP1</li> <li>• Exchange2010_SP2</li> <li>• Exchange2007_SP1</li> </ul> </li> </ul>

10. Click Apply.

- 
11. 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.

### Prerequisites

First, connect to the email server. [Using the Connect action](#)

You must use the following Email actions within a loop:

- Change status
- Delete
- Save attachments
- Save email

### Procedure

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.

6. Optional: In the When subject contains field, specify a value to retrieve emails containing the value you specified in their subject.
7. Optional: In the From specific senders field, specify the email addresses to retrieve the emails.

8. Optional: In the When received date is on or after list, select an option to retrieve specific emails on or after a certain date.
9. 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.

10. In the Plain text or HTML options, select the format that you want to use.
11. 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](#).

12. Click Apply.

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	<p>Retrieves emails with the exact subject text and is case-sensitive.</p> <p>Example: <code>[Subject]=["Automation"]</code>: The filter retrieves emails where the subject text includes "Automation" as an exact word.</p>
Multiple text within double quotation marks	<p>Retrieves emails with the exact subject text and is case-sensitive.</p> <p>Example: <code>[Subject]=["Automation Anywhere"]</code>: The filter retrieves emails where subject text includes "Automation Anywhere" as an exact phrase.</p>
Single text without double quotation marks	Retrieves emails that have the similar text and is not case-sensitive.

Single subject	Email server and Outlook
	Example: [Subject]=[Automation]: The filter searches and retrieves emails where the subject text includes Automation.
Multiple text without double quotation marks	<p>Retrieve emails with any text or combination of text and is not case-sensitive.</p> <p>Example: [Subject]=[Automation Anywhere]: The filter searches and retrieves emails where subject text includes Automation or Automation Anywhere.</p>

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	<p>Retrieve emails for each subject that is an exact match and is case-sensitive.</p> <p>Example: [Subject 1] =["Delivery Failure"]; [Subject 2] =["Mail server not found"]</p> <p>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".</p>	<p>Retrieves emails with the complete subject line that is an exact match including the semicolon and double quotation marks.</p> <p>Example: [Subject 1] =["Delivery Failure"]; [Subject 2] =["Mail server not found"], separated by a semicolon.</p> <p>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".</p>
Subjects without double quotation marks	<p>Retrieve emails for each subject and is not case-sensitive.</p> <p>Example: [Subject 1]= [Delivery Failure]; [Subject 2]= [Mail server not found]</p> <p>The filter retrieves emails that include the subject line with text as Delivery Failure or Mail server not found.</p>	<p>Retrieve emails with the complete subject line including the semicolon.</p> <p>Example: [Subject 1]= ["Delivery Failure"]; [Subject 2]= ["Mail server not found"], separated by a semicolon.</p> <p>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.</p>

Multiple subjects separated by semicolon	Email server	Microsoft Outlook
Some subject in double quotation marks and some without double quotation marks	<p>Retrieve emails for each subject. Subjects within double quotation marks are an exact match. Subjects without double quotes are not case-sensitive.</p> <p>Example: [Subject 1]= [Delivery Failure]; [Subject 2] = ["Mail server not found"]</p> <ul style="list-style-type: none"> <li>For Subject 1, the filter searches and retrieves emails that include the text in the subject line.</li> <li>For Subject 2, the filter searches and retrieve emails with the exact text in the subject line.</li> </ul>	<p>Retrieve emails with the complete subject line that is an exact match including the semicolon.</p> <p>Example: [Subject 1]= [Delivery Failure]; [Subject 2]= ["Mail server not found"], separated by a semicolon.</p> <p>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.</p>

## 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	<p>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.</p> <p>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 &gt; Send action. You can use the actions from the Screen package to capture a screenshot of a window or application when the error occurs.</p>

Action	Description
	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.
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:

Using 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.

Note: This package supports files up to 7 MB in size. The XLS and CSV formats are not supported and you cannot set a value in the XFD column of a spreadsheet.

## 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](#).

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	<p>Switches to another sheet in a Microsoft Excel file.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Select the Sheet by Index (numerical value) or Sheet by Name option to specify how to activate the sheet.</li> </ul>
Close	<p>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 current workbook with the Open action.</p> <p>Note: This action terminates the process for the session.</p>

Action	Description
Delete cell	<p>Deletes the Active cell or a Specific cell from the current worksheet or a CSV file.</p> <ul style="list-style-type: none"> <li>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.</li> <li>Select the Entire row or Entire column option to specify whether to delete the entire row or column of the cell.</li> </ul>
Find	See <a href="#">Using Find action</a> .
Get cell address	<p>Retrieves the location of the active cell and stores it to a string variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>In the Save the active cell address in local variable field, create or insert an existing string variable.</li> </ul>
Get column name	<p>Retrieves the letter value of the column of the active or specific cell and stores it to a string variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell or Specific cell option to specify whether to retrieve the column name from the active cell or a specific cell.</li> <li>In the Save the column name into local variable field, create or insert an existing string variable.</li> </ul>
Get multiple cells	<p>Retrieves the values from cells in a Microsoft Excel spreadsheet and stores them in a table variable.</p> <p>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.</p> <p>Note: You must convert the values to perform non-string operations.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Multiple cells or All cells option to specify whether to retrieve the values from a range of cells or all the cells.</li> </ul>
Get row number	<p>Retrieves the row number of the active or specific cell and stores it to a string variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell or Specific cell option to specify whether to retrieve the row number from the active cell or a specific cell.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>In the Save the row number into local variable field, create or insert an existing string variable.</li> </ul>
Get single cell	<p>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.</p> <p>Note: You must convert the values to perform non-string operations.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell or Specific cell option to specify whether to retrieve the values from the active cell or a specific cell.</li> </ul> <p>You can use the output value to <a href="#">Example of using a conditional statement</a>.</p>
Go to cell	<p>Selects a specific cell in a Microsoft Excel spreadsheet or a CSV file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell or Specific cell option to specify which cell to select.</li> </ul>
Open	<p>Reads data from a Microsoft Excel spreadsheet. See <a href="#">Using the Open action for Excel</a>.</p> <p>Note: This action does not open a Microsoft Excel spreadsheet. It only enables a task to read data from the spreadsheet.</p>
Replace	See <a href="#">Using the Replace action</a> .
Save workbook	Saves a Microsoft Excel spreadsheet to a specified location.
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.
Switch to sheet	<p>Activates a specific worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select to activate the worksheet by the Index value or worksheet Name.</li> </ul> <p>The index is the numeric value assigned to the worksheet.</p>

## 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, .xlsm, and .xlsm formats. You can also use some of the actions with the .csv format. See [CSV operations](#).

See [Example of migrating data from Excel to a database](#).

## 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 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](#).  
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](#).
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 <a href="#">Cell operations</a> .

Action	Description
Row and column operations	Perform operations such as inserting new rows and columns, and hiding and unhiding rows and columns. See <a href="#">Row and column operations</a> .
Table operations	Perform operations such as sorting and filtering data in a table, inserting and deleting columns, and getting the table range. See <a href="#">Table operations</a> .
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 <a href="#">Workbook operations</a> .
Worksheet operations	Perform operations such as creating and deleting a worksheet, appending data, and hiding and unhiding a worksheet. See <a href="#">Worksheet operations</a> .

Example tasks:

- [Example of transferring data from CSV file to Excel worksheet](#)
- [Example of using a conditional statement](#)

Watch the following video on how to use the Excel advanced package:

Using Excel advanced package

Related tasks

[Using Find action](#)

## 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	<p>Adds all the worksheets from the specified workbook to the end of the currently open workbook.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Specify the workbook from which you want to append the worksheets in the Append from workbook field.</li> <li>• If the workbook is protected, select the Password is required check box and enter the password in the To open field.</li> </ul>
Close	Closes the current workbook and provides an option to Save changes when closing the file.

Action	Description
	<ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> </ul>
Convert excel to PDF	<p>Converts the entire workbook, specific worksheets in a workbook, or a CSV file to a PDF file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify whether you want to convert the Entire excel file, Active sheet, or Specific sheet to a PDF file.</li> <li>Enter a name for the PDF file in the Select PDF file name field.</li> <li>Specify the location where you want to save the file in the Select PDF storage location field.</li> </ul>
Create workbook	<p>Creates a Microsoft Excel workbook or a CSV file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the location where you want to save the workbook in the File path field.</li> <li>Specify the name of the worksheet and passwords to open and edit the workbook.</li> </ul>
Open	See <a href="#">Using the Open action for Excel</a> .
Protect workbook	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Protect workbook and Protect workbook structure check boxes and provide a password in the respective fields.</li> </ul>
Save workbook	Saves the current workbook. Enter the name of the session used to open the current workbook with the Open action.
Unprotect workbook	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Select the Unprotect workbook and Unprotect workbook structure check boxes and provide a password to unprotect the workbook structure.</li> </ul>

## 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:

### Procedure

1. Double-click or drag the Open action from the Excel node in the Actions palette.
2. Specify a name for the session in the Session name field.
3. 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.
4. Select the Specific sheet name option and specify the name of the sheet to activate when the Microsoft Excel spreadsheet opens.
5. Select Read-only mode or Read-write mode to open the Microsoft Excel spreadsheet in read-only or edit mode respectively.
6. Select the Password is required check box if a password is required to open or edit the Microsoft Excel spreadsheet.
7. 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.
8. Select the Sheet contains a header check box if the Microsoft Excel spreadsheet contains a header row.
9. Select the Load Add-ins check box if you want to load the add-ins available in the Microsoft Excel spreadsheet.
10. Click Apply.

## 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	<p>Accesses a password-protected worksheet in the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the password to access the worksheet.</li> </ul>
Append worksheet	See <a href="#">Using Append worksheet action</a> .
Create worksheet	<p>Creates a worksheet in the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul>
Delete worksheet	<p>Deletes a spreadsheet from the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul> <p>Note: You can delete a worksheet only if the workbook contains more than one worksheet.</p>
Get current worksheet name	<p>Gets the name of the current worksheet and assigns it to a string variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.</li> </ul>
Get worksheet as data table	<p>Gets data from a worksheet and saves it in a table variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> <li>Choose from the Read option to read either the visible text or value of the cell.</li> </ul> <p>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%.</p> <p>Recommendation: Use option Read cell value as reading value from a cell gives better performance than reading a visible text.</p> <ul style="list-style-type: none"> <li>Select a table variable that you want to use to store the data from the worksheet from the Assign value to the variable list.</li> </ul>
Get worksheet names	<p>Gets the names of all the worksheets and assigns them to a list variable of string data type.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.</li> </ul>
Hide worksheet	<p>Hides a worksheet from the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the name of the worksheet to hide in the Enter worksheet name to hide field.</li> </ul> <p>Note: You can hide a worksheet only if the workbook contains more than one worksheet.</p>
Password protect worksheet	<p>Protects a worksheet with a password. You can also specify the operations to restrict on the worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul>
Rename worksheet	Renames a worksheet in the current workbook.

Action	Description
	<ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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 <b>3</b> in the field.</li> <li>Note: You cannot rename the worksheet if a worksheet with the same name already exists in the workbook.</li> <li>Enter the new worksheet name that is under 31 characters.</li> </ul>
Retrieve sheets count	<p>Gets the number of sheets available in the current workbook and stores it in a number variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the appropriate option to specify whether to include the hidden worksheet or not and assign the count to a variable.</li> </ul>
Run macro	<p>Runs a macro in a worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the name of the macro you want to run and its arguments.</li> </ul>
Switch to sheet	<p>Activates a particular sheet in a Microsoft Excel file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify whether to activate the Sheet by Index (numerical value) or Sheet by Name.</li> </ul>
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	<p>Unhides a specific worksheet in the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the name of the worksheet you want to unhide.</li> </ul>
Write data table to worksheet	<p>Writes data available in a data table variable in a worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the data table variable that contains the data you want to write in a worksheet.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Specify whether you want to write data in the currently Active worksheet or Specific worksheet.</li> <li>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.</li> </ul>

## 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:

### Procedure

1. Double-click or drag the Append worksheet action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. 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.
4. Select the Password is required option if the Microsoft Excel spreadsheet requires a password to open it.
5. 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.
6. Select the Enter worksheet name or Enter worksheet index option to specify the name or number of the worksheet that you want to append.
7. Click Apply.

## 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	<p>Retrieves the column that contains the specific cell and stores it to a string variable. This action supports .xlsx and .xlsm files.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the From active cell or From specific cell option to specify the cell location.</li> <li>Select a string variable from the Save the column name to variable list.</li> </ul>
Get Row	<p>Retrieves the row that contains the specific cell and stores it to a string variable. This action supports .xlsx and .xlsm files.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the From active cell or From specific cell option to specify the cell location.</li> <li>Select a string variable from the Save the row name to variable list.</li> </ul>
Hide row(s)/column(s) in selection	<p>Hides rows or columns in the current worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the appropriate option to specify whether to hide one or more rows and columns.</li> </ul>
Insert/Delete Row(s)/Column(s)	See <a href="#">Using Insert or Delete actions for rows and columns</a> .
Read column	<p>Extracts data from a column and stores it in a list variable of string data type.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Choose from the Read option to read either the visible text or value of the cell.</li> </ul> <p>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%.</p> <p>Recommendation: Use the Read cell value option as reading value from a cell for better performance than reading visible text.</p> <ul style="list-style-type: none"> <li>Select a list variable of string data type that you want to use to store the extracted values.</li> </ul>

Action	Description
Read row	<p>Extracts data from a row and stores it in a list variable of string data type.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Choose from the Read option to read either the visible text or value of the cell.</li> </ul> <p>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%.</p> <p>Recommendation: Use option Read cell value as reading value from a cell gives better performance than reading a visible text.</p> <ul style="list-style-type: none"> <li>Select a list variable of string data type that you want to use to store the extracted values.</li> </ul>
Remove blank rows	Removes blank rows from the current worksheet. You can specify the range from which you want to delete the blank rows.
Select cell(s)/row(s)/column(s)	See <a href="#">Using Select action for cells, rows, and columns</a> .
Unhides row(s)/column(s) in selection	<p>Unhides the hidden rows or columns in the current worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the appropriate option to specify whether you want to unhide a row or column and which row or column to unhide.</li> </ul>

## 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:

### Procedure

- Double-click or drag the Insert or Delete action from the Excel node in the Actions palette.
- Specify the name of the session in which you want to perform the action in the Session name field.
- 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.

- b) 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.
4. Select the Column operations if you want to insert or delete columns from the spreadsheet.
    - a) Select the Insert Column at option to insert a column and specify the location where you want to insert the column in the field.
    - b) 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.
  5. Click Apply.

## 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:

### Procedure

1. Double-click or drag the Select cell, row, or column action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. Select an option from the Select list to specify whether you want to select a cell, row, or column.
  - a) If you have selected the Cell option, select any of the following options:
    - b) Active cell: Enables you to select the active cell from the worksheet.
    - c) Specific cell: Enables you to select the cell you have specified in the field.
    - d) Cell range: Enables you to select all the cells in the range you have specified in the field.
    - e) All cells in the sheet: Enables you to select all the cells in the worksheet.
  - f) If you have selected the Column option, select any of the following options:
    - g) Column of active cell: Selects the column of the current active cell in the worksheet.
    - h) Specific column: Enables you to select the column you have specified in the field.
    - i) Column range: Enables you to select all the columns in the range you have specified in the field.
  - j) If you have selected the Row option, select any of the following options:
    - k) Row of active cell: Selects the row of the current active cell in the worksheet.
    - l) Specific row: Enables you to select the row you have specified in the field.
    - m) Row range: Enables you to select all the rows in the range you have specified in the field.
4. Click Apply.

## 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	<p>Deletes the Active cell or a Specific cell from the current worksheet or a CSV file.</p> <p>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>.</p> <p>After deleting the cell, you can:</p> <ul style="list-style-type: none"> <li>Shift cells left: Deletes the specified cell and shifts the cell one position to the left.</li> <li>Shift cells up: Deletes the specified cell and shifts the cell one position up.</li> <li>Entire row: Deletes the entire row that contains the cell you have specified to delete.</li> <li>Entire column: Deletes the entire column that contains the cell you have specified to delete.</li> </ul>
Find next empty cell	See <a href="#">Using Find next empty cell action</a> .
Find	See <a href="#">Using Find action</a> .
Get cell address	<p>Retrieves the location of the active cell and stores it to a string variable. This action supports .xlsx and .xlsm files.</p> <p>See <a href="#">Using the Get cell address action</a></p>
Get cell color	See <a href="#">Using Get cell color action</a> .
Get multiple cells	<p>Retrieves the values from the cells in a Microsoft Excel spreadsheet and stores them in a table variable.</p> <p>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.</p> <p>Note: You must convert the values to perform non-string operations.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Multiple cells option to retrieve values from a range of cells, or select All cells to retrieve values from all the cells.</li> <li>Choose from the Read option to read either the visible text or value of the cell.</li> </ul>

Action	Description
	<p>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%.</p> <p>Recommendation: Use the Read cell value option as the reading value for a better performance than reading visible text.</p>
Get number of rows	See <a href="#">Using Get number of rows action</a> .
Get single cell	<p>Retrieves the values from a single cell in a Microsoft Excel spreadsheet or a CSV file and stores them in a string variable.</p> <p>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.</p> <p>Note: You must convert the values to perform non-string operations.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Choose from the Read option to read either the visible text or value of the cell.</li> </ul> <p>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%.</p> <p>Recommendation: Use the Read cell value option as the reading value from a cell for a better performance than reading visible text.</p> <p><a href="#">Example of using a conditional statement</a>.</p>
Go to cell	<p>Moves the cursor to a specific cell in a Microsoft Excel spreadsheet or a CSV file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul> <p>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 <b>A2 : C2</b></p>
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.

Action	Description
	<ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Select the left, right, up, or down option to specify the direction in which to search for the next empty cell.</li> </ul>
Read cell formula	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Select a string variable to store the name of the formula from the Assign the output to variable list.</li> </ul>
Replace	See <a href="#">Using the Replace action</a> .
Set cell	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul> <p>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</p> <ul style="list-style-type: none"> <li>Enter the value to set in the Cell value field.</li> </ul>
Set cell formula	<p>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 &gt; Random action. See <a href="#">Random action</a>.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> <li>Enter the formula to set in the Enter formula for specific cell field.</li> </ul>

## 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:

### Procedure

1. Double-click or drag the Find action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
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. Specify the string you want to search for in the Find field.
6. 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.
7. Select the list variable of string data type that you want to use to store the output from the Assign cell addresses variable list.
8. In the Assign value to variable list, select a string variable.
9. Click Apply.

## 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.

### Procedure

1. Double-click or drag the Replace action from the Excel advanced node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
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. Specify the string you want to search for in the Find field.
  6. 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.
  7. Select Replace with and specify the replacement string.
  8. Select Replace with and specify the replacement string, or leave the field blank to replace the matching cells with an empty character.
  9. Click Apply.
  10. 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:

### Procedure

1. Double-click or drag the Find next empty cell action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. 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.
4. 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.
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. Click Apply.

## 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:

## Procedure

1. Double-click or drag the Get cell color action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. 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.
4. 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.
5. 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.
6. Select the string variable you want to use to store the address of the empty cell from the Assign the output to variable list.
7. Click Apply.

## 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.

## Prerequisites

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.

## Procedure

1. Double-click or drag the Get cell address action from the Excel advanced node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. 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.
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: a) 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>

Option	Steps
	<p>If you did not select that option, enter the default column name. For example, <b>A</b>.</p> <p>Note: This field is not case-sensitive.</p> <p>b) 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.</p> <p>For example, if the header cell is located at B1 and you specify 2 as the cell position, the action will return B3.</p>

4. 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.
5. In the Save active or user specified cell address in local variable field, create or insert an existing string variable.
6. Click Apply.
7. Click Save.

## Next steps

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](#).

## 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:

## Procedure

1. Double-click or drag the Get number of rows action from the Excel node in the Actions palette.
2. Specify the name of the session in which you want to perform the action in the Session name field.
3. 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 of rows.
4. 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.
5. Select the number variable you want to use to store the output from the Assign to variable list.
6. Click Apply.

## 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	<p>Deletes a column in a table.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Specify the Table name from which you want to delete a column.</li> </ul> <p>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 <a href="#">Rename an Excel table</a>.</p> <ul style="list-style-type: none"> <li>• Select the Name or Position to specify the name or position of the column to delete.</li> </ul>
Filter table	See <a href="#">Using Filter table action</a> .
Get table range	<p>Gets the range of a table available in a worksheet and stores the output in a string variable.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Specify the Table name for which you want to get the range.</li> </ul> <p>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 <a href="#">Rename an Excel table</a>.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>

Action	Description
Insert table column	<p>Inserts a column in a table.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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 <a href="#">Rename an Excel table</a>.</li> <li>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.</li> </ul>
Sort table	<p>Sorts the data in a column of a table. This action enables you to sort numeric and text data.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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 <a href="#">Rename an Excel table</a>.</li> <li>Select the Column name or Column position to specify the name or position of the column.</li> <li>Select an appropriate option from the Number or Text list to specify the sort order.</li> </ul>

## 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:

### Procedure

- Double-click or drag the Filter table action from the Excel node in the Actions palette.
- Specify the name of the session in which you want to perform the action in the Session name field.
- 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.

- c) Does not equal: Filters the data that is not equal to the value you have specified.
- d) Greater than: Filters the data that is greater than the value you have specified.
- e) Greater than or equal to: Filters the data that is greater than or equal to the value you have specified.
- f) Less than: Filters the data that is less than the value you have specified.
- g) Less than or equal to: Filters the data that is less than or equal to the value you have specified.
- h) 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.

6. 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:
    - b) Equals: Filters the data that is equal to the value you have specified.
    - c) Does not equal: Filters the data that is not equal to the value you have specified.
    - d) Begins with: Filters the data that begins with the value you have specified.
    - e) Ends with: Filters the data that ends with the value you have specified.
    - f) Contains: Filters the data that contains the value you have specified.
    - g) Does not contain: Filters the data that does not contain the value you have specified.
7. Click Apply.

## 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](#).

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 <a href="#">Using Copy action for file</a> .
Create	<p>Creates a new file.</p> <ul style="list-style-type: none"> <li>In the File field, specify the name including the location to store the file.</li> <li>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.</li> </ul>
Create shortcut	<p>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.</p> <ul style="list-style-type: none"> <li>In the Source folder field, specify the name and location.</li> <li>In the Destination folder field, specify the name and location.</li> </ul>
Delete	See <a href="#">Using Delete action for file</a> .
Download CR file	<p>Downloads a file from the Enterprise Control Room to a specified location on the device.</p> <p>Note: You cannot use this action to download a bot or a file from the My Scripts folder.</p> <ul style="list-style-type: none"> <li>In the Select a Control Room file field, specify the file to download.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> <li>Select True or False, or insert a Boolean variable to specify whether to overwrite the existing file.</li> </ul>
Open	Opens an existing file. In the File field, specify the name including the location to store the file.
Print	See <a href="#">Using Print action for file</a> .
Print multiple files	See <a href="#">Using Print multiple files action</a> .
Rename	See <a href="#">Using Rename action for file</a> .

#### Related reference

[If package](#)

[Loop package](#)

[Variables overview](#)

## 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.

### Procedure

To copy an existing file, follow these steps:

1. In the Actions palette, double-click or drag the Copy action from the File package.
2. In the Source file field, specify the name and location of the file.
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:
    - b) Atleast: Copies a file only if the file size is more than the size you have specified.
    - c) Atmost: Copies a file only if the file size is less than the size you have specified.
    - d) Exact: Copies a file only if the file size is the same as the size you have specified.
  - e) 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:

- b) Created: Enables you to copy a file based on the date it was created.
- c) Modified: Enables you to copy a file based on the date it was modified.

d) 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.

e) 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.

f) 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 Apply.

8. 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.

### Procedure

Follow these steps to delete a file:

1. In the Actions palette, double-click or drag the Delete 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 delete a file based on its size.

a) Select any of the following options from the list:

- b) Atleast: Deletes a file only if the file size is more than the size you have specified.
- c) Atmost: Deletes a file only if the file size is less than the size you have specified.
- d) Exact: Deletes a file only if the file size is the same as the size you have specified.

e) Specify a value in the Size field.

4. Select the Date check box to delete a file based on the date it was created or modified.

a) Select any of the following options from the list:

- b) Created: Enables you to delete a file based on the date it was created.
- c) Modified: Enables you to delete a file based on the date it was modified.

d) 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.

e) 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.

f) 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 **Apply**.

6. 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.

### Procedure

To rename a file, follow these steps:

1. In the Actions palette, double-click or drag the Rename action from the File package.

2. In the File field, specify the name and location of the file you want to rename.

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:

- b) Atleast: Renames a file only if the file size is more than the size you have specified.
- c) Atmost: Renames a file only if the file size is less than the size you have specified.
- d) Exact: Renames a file only if the file size is the same as the size you have specified.

e) 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:

- b) **Created**: Enables you to rename a file based on the date it was created.
- c) **Modified**: Enables you to rename a file based on the date it was modified.

d) 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.

e) 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.

f) 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 Apply.

7. 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.

### Procedure

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:
    - b) Atleast: Prints a file only if the file size is more than the size you have specified.
    - c) Atmost: Prints a file only if the file size is less than the size you have specified.
    - d) Exact: Prints a file only if the file size is the same as the size you have specified.
  - e) 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:
    - b) Created: Enables you to print a file based on the date it was created.
    - c) Modified: Enables you to print a file based on the date it was modified.
  - d) 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.

e) 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.

f) 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 Apply.
6. 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.

### Procedure

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. Optional: In the File type field, specify the file type of your files.
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:
    - b) Atleast: Prints multiple files only if the file size is more than the size you have specified.
    - c) Atmost: Prints multiple files only if the file size is less than the size you have specified.
    - d) Exact: Prints multiple files only if the file size is the same as the size you have specified.
  - e) 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:
    - b) Created: Enables you to print multiple files based on the date they were created.
    - c) Modified: Enables you to print multiple files based on the date they were modified.
  - d) 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.
  - e) 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.
  - f) 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 Apply.
8. 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 <a href="#">Using Copy action</a> .
Create	<p>Creates a new folder.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>
Create shortcut	<p>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.</p> <ul style="list-style-type: none"> <li>In the Source folder field, specify the name and location.</li> <li>In the Destination folder field, specify the name and location.</li> </ul>
Delete	See <a href="#">Using Delete action</a> .
Open	<p>Opens a folder at a specific location.</p> <p>In the Folder field, specify the name and location.</p>
Rename	See <a href="#">Using Rename action</a> .
Unzip	See <a href="#">Using Unzip action</a> .
Zip	See <a href="#">Using the Zip action</a> .

## Using Copy action

Use the Copy action to copy an existing folder.

### Procedure

- 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.

3. In the Destination folder field, specify the folder name and location to save the copied folder.
4. 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.
5. Select the Size check box to copy a folder based on its size.
  - a) Select any of the following options from the list:
    - b) Atleast: Copies a folder only if the folder size is more than the size you have specified.
    - c) Atmost: Copies a folder only if the folder size is less than the size you have specified.
    - d) Exact: Copies a folder only if the folder size is the same as the size you have specified.
    - e) In the Size field, specify the folder size.
6. Select the Date check box to copy a folder based on the date.
  - a) Select any of the following options from the list:
    - b) Created: Enables you to copy a folder based on the date it was created.
    - c) Modified: Enables you to copy a folder based on the date it was modified.
  - d) 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.
  - e) 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.
  - f) Note: The Start date and End date are included in the period.
7. Click Apply.
8. Click Save.

## Using Delete action

Use the Delete action to delete a folder.

### Procedure

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:
    - b) Atleast: Deletes a folder only if the folder size is more than the size you have specified.
    - c) Atmost: Deletes a folder only if the folder size is less than the size you have specified.

- d) Exact: Deletes a folder only if the folder size is the same as the size you have specified.
  - e) 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:
    - b) Created: Enables you to delete a folder based on the date it was created.
    - c) Modified: Enables you to delete a folder based on the date it was modified.
  - d) 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.
  - e) 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.
  - f) 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 Apply.  
6. Click Save.

## Using Rename action

Use the Rename action to rename a folder.

### Procedure

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:
    - b) Atleast: Renames a folder only if the folder size is more than the size you have specified.
    - c) Atmost: Renames a folder only if the folder size is less than the size you have specified.
    - d) Exact: Renames a folder only if the folder size is the same as the size you have specified.
  - e) 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:
    - b) Created: Enables you to rename a folder based on the date it was created.
    - c) Modified: Enables you to rename a folder based on the date it was modified.
  - d) 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.

e) 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.

f) 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 **Apply**.

7. Click **Save**.

## Using Unzip action

Use the Unzip action to extract compressed files and folders from a zip file to a specific location.

### Procedure

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 **Apply**.
7. Click **Save**.

## Using the Zip action

Use the Zip action to compress files and folders into a zip file.

### Procedure

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. Optional: In the Specify file type(s) to compress field, specify the 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.
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 Apply.
10. 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	<p>Navigates to either the parent folder or another specific folder on an FTP/SFTP server.</p> <ul style="list-style-type: none"> <li>• Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>• Select either Go to parent folder or Specific folder in Navigate to options.</li> </ul> <p>If the Specific folder option is selected, enter the complete folder path.</p>
Connect	See <a href="#">Using Connect action for FTP/SFTP</a> .
Create folder	<p>Creates a folder in an existing folder on the FTP/SFTP server.</p> <ul style="list-style-type: none"> <li>• Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>• Specify the folder name in the Remote folder field with the path to create a folder on the FTP server.</li> </ul> <p>Note: The system encounters an error if a folder with the same name exists in the parent folder.</p>
Delete files	<p>Deletes files from an FTP/SFTP folder.</p> <ul style="list-style-type: none"> <li>• Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>• Specify file names in the Remote files field along with the complete path, separated by a semicolon.</li> </ul>
Delete folder	Deletes a folder (including all the subfolders and files within it) from an FTP/SFTP server.

Action	Description
	<ul style="list-style-type: none"> <li>Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>Specify the folder name in the Remote folder field.</li> </ul>
Disconnect	<p>Terminates the connection to the FTP/SFTP server.</p> <p>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.</p>
Get files	<p>Downloads files from a remote FTP/SFTP folder to a specific folder on the client machine.</p> <ul style="list-style-type: none"> <li>Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>Select files on the remote FTP server that you want to download on the local system.</li> <li>In the Local folder field, enter the name of the folder where you want to download files from the FTP/SFTP server.</li> <li>Select the Transfer Type as Binary or ASCII.</li> <li>You can also specify folders based on the date they are created or modified.</li> </ul>
Get folders	<p>Downloads a folder from an FTP/SFTP server to a client machine.</p> <ul style="list-style-type: none"> <li>Enter the session name.</li> </ul> <p>Use the same session name that you have provided when establishing a connection with the FTP/SFTP server using the Connect action.</p> <ul style="list-style-type: none"> <li>Select folders on the remote FTP server that you want to download on the local system.</li> </ul> <p>Specify filters using wildcard characters to download only specific types of files.</p> <ul style="list-style-type: none"> <li>In the Local folder field, enter the name of the folder where you want to download files from the FTP/SFTP server.</li> <li>You can also specify folders based on the date they are created or modified.</li> </ul>
Put files	Uploads one or more files from the client machine to the FTP/SFTP server.

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> <li>Enter all the file names along with their location, separated by a semicolon.</li> <li>Select the Transfer type to be either Binary or ASCII</li> </ul>
Put folders	<p>Uploads a folder from the client machine to the FTP/SFTP server.</p> <ul style="list-style-type: none"> <li>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.</li> <li>Enter the folder name in the Local folder field which you want to upload on FTP/SFTP server.</li> <li>Specify filters using wild card characters to restrict uploads to specific types of files.</li> </ul>
Rename files	<p>Renames files in an FTP/SFTP folder.</p> <ul style="list-style-type: none"> <li>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.</li> <li>In the Remote file field, enter the name of the file that you want to rename.</li> <li>Enter the new name in the New remote file field.</li> </ul>

## 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.

### Procedure

To establish a connection with an FTP/SFTP server, perform these steps:

- Double-click or drag the Connect action from the FTP/SFTP node in the Actions palette.
- Enter a name for the session in the Session name field.
- Enter the FTP/SFTP server name in the Server name field.
- Specify the port number.
- Select one of the following options to specify the server type:

Option	Steps
FTP	<p>Authentication type: You can either choose to authenticate the user using User credentials or log in as Anonymous.</p> <p>If you choose User credentials, complete these fields:</p> <p>Username: Select Credential for enhanced security or String:</p> <ul style="list-style-type: none"> <li>• Credential: Select the Credential Vault variable to insert the Username and Password.</li> <li>• String: Enter the value directly in the field.</li> </ul> <p>Transfer Mode: Select the transfer mode to be Active or Passive.</p> <p>Transfer type: Select the type to be either Binary or ASCII for transferring files between the server and client.</p> <p>Optional: Enter the default directory path on the FTP server.</p>
FTP Secure	<p>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:</p> <p>Username: Select Credential for enhanced security or String:</p> <ul style="list-style-type: none"> <li>• Credential: Select the Credential Vault variable to insert the Username and Password.</li> <li>• String: Enter the value directly in the field.</li> </ul>
SSH FTP	<p>Select the Private Key File from Control Room file, Desktop file, or Variable.</p> <p>Note: Ensure that the SFTP server has a corresponding public key file.</p> <p>You can either choose to authenticate the user using User credentials or log in as Anonymous. If you choose User credentials, complete these fields:</p> <ul style="list-style-type: none"> <li>• With username: To enter the Username, select Credential or String option.</li> <li>• Credential: Select the Credential Vault variable to insert the Username.</li> <li>• String: Enter the value directly in the field.</li> <li>• With username-password: To enter the Username and Password, select either the Credential or String option.</li> </ul> <p>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.</p>

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 Apply, and then 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](#).
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 <a href="#">Using the Create new calendar event action</a> .
Delete event	<p>Removes the event from the calendar.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• Enter the Event Id.</li> <li>• Optional: Assign the event to a String variable.</li> </ul>

- [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.

## 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.

### Procedure

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](#).
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 Apply.

## 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](#).
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	<p>Copies a file from one folder to another in the Google Drive</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• 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 <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</li> <li>• Select whether to identify the destination folder by directory path and name, or by ID.</li> <li>• Optional: Mark the Rename file option and enter the new file name.</li> </ul>
Create file permission	<p>Creates a new permission for a file.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• 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 <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</li> <li>• Select a role. For more information, see <a href="#">Google Drive Roles</a>.</li> <li>• Select the grantee type. Choose from: <ul style="list-style-type: none"> <li>• User</li> <li>• Group</li> <li>• Domain</li> <li>• Anyone</li> </ul> </li> <li>• If you select User or Group, enter the email address. If you select domain, enter the domain name.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>• Optional: Select or create a variable to hold the permission ID.</li> </ul>
Delete file	<p>Deletes a file on your Google Drive.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• 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 <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is 12d1AwvrEA4JeLysfFky9.</li> <li>• Optional: Select or create a boolean variable to hold the file delete status.</li> </ul>
Delete file permission	<p>Deletes a file permission for a file.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• 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 <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is 12d1AwvrEA4JeLysfFky9.</li> <li>• In the Permission id field, enter the permission ID.</li> <li>• Optional: Select or create a variable to hold the permission ID.</li> </ul>
Download file	<p>Downloads a file from your Google Drive to a specific location on your desktop.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• 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 <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is 12d1AwvrEA4JeLysfFky9.</li> <li>• Specify the download file path. For example, C:/Users/Downloads.</li> <li>• Optional: Mark the Overwrite existing file option to overwrite the file of the same name.</li> <li>• Optional: Mark the Rename file option to enter a new name for the downloaded file.</li> <li>• Optional: Select or create a variable to hold the ID of the downloaded file.</li> </ul>
Find file/folder	<p>Finds files or folders in a specific directory in your Google Drive.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• Select whether to search for files or folders.</li> <li>• Enter the source folder to search in. For example, /Home/Accounts/.</li> <li>• Specify whether to return exact matches or</li> <li>• Enter the file or folder name to search for.</li> <li>• Select or create a variable to hold the list of files or folders.</li> </ul>
Get file information	<p>Gets file information of a file.</p> <ul style="list-style-type: none"> <li>• Enter the same session name that you provided in the OAuth action.</li> <li>• Select whether to identify the file by file path and name, or by ID.</li> </ul>

Action	Description
	<p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Select or create a dictionary variable to hold the file information which is stored in two keys: <code>name</code> key holds the file name and the <code>extension</code> key holds the file extension.</li> </ul>
Get file permission	<p>Retrieves file information for specific file or folder from Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the file by file path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Select or create a list variable to hold the file permissions.</li> </ul>
Move file	<p>Moves a file from one folder to another.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the file by file path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Select whether to identify the destination folder by directory path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p>
Open file	<p>Opens a file from the specified directory in Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the file by file path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p>
Open folder	<p>Opens a folder from the specified directory in Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the folder by directory path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p>
Rename file	<p>Renames a file in the Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the file by file path and name, or by ID.</li> </ul>

Action	Description
	<p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Enter the new file name.</li> </ul>
Rename folder	<p>Renames a folder in a specific directory in Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the folder by directory path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Enter the new folder name.</li> </ul>
Upload file	<p>Uploads a file from the desktop to your Google Drive.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Enter the file path and name.</li> <li>Select whether to identify the folder where to upload the file by directory path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>Optional: Mark the Overwrite existing file option to overwrite the file of the same name.</li> <li>Optional: Select or create a variable to hold the ID of the uploaded file.</li> </ul>
Update file permission	<p>Update the permissions for a file.</p> <ul style="list-style-type: none"> <li>Enter the same session name that you provided in the OAuth action.</li> <li>Select whether to identify the file by file path and name, or by ID.</li> </ul> <p>Note: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is <code>12d1AwvrEA4JeLysfFky9</code>.</p> <ul style="list-style-type: none"> <li>In the Permission id field, enter your user ID.</li> <li>Select a role. For more information, see <a href="#">Google Drive Roles</a>.</li> <li>Optional: Select or create a variable to hold the permission ID.</li> </ul>

## 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](#).
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	<p>Activates a specific sheet in the open spreadsheet.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>• Specify whether to activate the sheet by index or name.</li> </ul>
Create spreadsheet	<p>Creates a new spreadsheet in your Google Drive.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>• Optional: Enter the file path. If you do not enter a value, the spreadsheet will be created under my-drive.</li> <li>• Enter the spreadsheet name.</li> <li>• Select a variable to hold the ID of the created spreadsheet.</li> </ul>
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	<p>Creates a new sheet in the open spreadsheet.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>• Specify whether to create the sheet by index or name</li> </ul>
Delete cells	<p>Deletes cells within a worksheet.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>• Select either the Active cell or Specific cell option. If you have selected the Specific cell, enter the cell address.</li> <li>• Select from the following delete options:           <ul style="list-style-type: none"> <li>• Shift cells left</li> <li>• Shift cells up</li> <li>• Entire row</li> <li>• Entire column</li> </ul> </li> </ul>

Action	Description
Delete worksheet	<p>Deletes a sheet from the current spreadsheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>Specify whether to delete the sheet by index or name.</li> </ul>
Find cells which contains search key	See <a href="#">Using the Find action</a>
Get multiple cells	<p>Retrieves the values from the cells in a Google sheet and stores them in a table variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>Select the Multiple cells option to retrieve values from a range of cells, or select All cells to retrieve values from all the cells.</li> <li>Select or create a table variable to hold the output.</li> </ul>
Get single cell	<p>Retrieves the value from the specific cell in a Google sheet and stores it in a string variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>Select either the Active cell or Specific cell option. If you have selected the Specific cell, enter the cell address.</li> <li>Select or create a string variable to hold the output.</li> </ul>
Go to cell	<p>Goes to the specified cell.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>Select either the Specific cell or Active cell option. <ul style="list-style-type: none"> <li>If you have selected the Specific cell option, enter the cell address. For example, <b>B4</b></li> <li>If you have selected the Active cell option, select the direction in which to move from the active cell.</li> </ul> </li> </ul>
Open spreadsheet	<p>Opens an existing spreadsheet.</p> <ul style="list-style-type: none"> <li>Enter a session name. Use this session name in subsequent actions to associate them with this spreadsheet.</li> <li>Select whether to open the spreadsheet by name, URL, or spreadsheet ID: <ul style="list-style-type: none"> <li>Name: Enter the file name.</li> <li>URL: Enter the entire URL.</li> </ul> </li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Spreadsheet ID: The ID is the value in the URL after the last forward slash. For example, if the URL is <a href="https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9">https://docs.google.com/spreadsheets/d/12d1AwvrEA4JeLysfFky9</a>, the ID is 12d1AwvrEA4JeLysfFky9.</li> <li>If the spreadsheet contains multiple sheets, select the Specific sheet name option and enter the sheet name.</li> </ul>
Read column	<p>Retrieves data from a column and stores it in a list variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>In the Cell name field, specify the cell location from which to read the values. For example, enter A5 to retrieve all the values located in the first column, below the fifth row.</li> <li>You can also select the Read full column option to extract values from the entire column.</li> <li>Select or create a list variable to hold the output.</li> </ul>
Read row	<p>Retrieves data from a row and stores it in a list variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>In the Cell name field, specify the cell location from which to read the values. For example, enter D5 to retrieve the values located in the fifth row and right of the fourth column.</li> <li>You can also select the Read full row option to extract values from the entire row.</li> <li>Select or create a list variable to hold the output.</li> </ul>
Set cell	<p>Sets the value of a specific cell.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current spreadsheet with the Open spreadsheet action.</li> <li>Enter the address of the cell. For example A5.</li> <li>Enter the value to set.</li> <li>Select or create a string variable to hold the value of the cell.</li> </ul>

- Using the Find action

Use the Find cells which contain search key action to find a particular string in a Google sheet.

## Using the Find action

Use the Find cells which contain search key action to find a particular string in a Google sheet.

## Procedure

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 Apply.

## 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.

Action	Description
	only once. To use this action, select the services to connect with, then provide the API Key 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	<p>Identifies the individuals in a conversation between multiple people.</p> <ul style="list-style-type: none"> <li>• Supports English, Japanese, and Spanish.</li> <li>• Use for conversation between two people; maximum six people.</li> <li>• For best results, use an audio file at least a minute long.</li> </ul> <p>The output contains the words spoken by each speaker and the timestamp.</p>
Keyword spotting	Detects specific strings in the transcript. The output contains the timestamp(s) for each keyword and a confidence score.
Smart formatting	<p>Converts the following types of strings into more conventional representations to make the transcript easier to read:</p> <ul style="list-style-type: none"> <li>• Dates</li> <li>• Times</li> <li>• Series of digits and numbers</li> <li>• Phone numbers</li> <li>• Currency values</li> <li>• Email and web addresses</li> </ul> <p>For examples, see <a href="#">Smart formatting results</a>. This feature supports English, Japanese, and Spanish.</p>
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	<p>Specifies a condition and holds a sequence of actions to run if the condition is true. See <a href="#">Using If action</a>.</p> <p>You can configure multiple conditions within a single If action.</p> <ol style="list-style-type: none"> <li>1. Click Add condition.</li> <li>2. Select either of the following options: <ul style="list-style-type: none"> <li>• And: Both of the conditions must be met for the actions to run.</li> <li>• Or: Either of the conditions must be met for the actions to run.</li> </ul> </li> <li>3. Select the condition from the drop-down list.</li> </ol>
Else if (optional)	<p>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.</p> <p>You can configure multiple conditions within a single Else if action.</p> <ol style="list-style-type: none"> <li>1. Click Add condition.</li> <li>2. Select either of the following options: <ul style="list-style-type: none"> <li>• And: Both of the conditions must be met for the actions to run.</li> <li>• Or: Either of the conditions must be met for the actions to run.</li> </ul> </li> <li>3. Select the condition from the drop-down list.</li> </ol>
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	<p>Use the Application is not running or Application is running condition to execute actions based on whether an application is running or not running.</p> <p>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.</p>
Boolean	Use the Boolean variable condition to execute actions based on whether a Boolean variable contains the value True or False.

Condition	Description
	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	<p>Use the Data table is empty condition to execute actions based on whether the specified table contains values.</p> <p>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.</p>
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	<p>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.</p> <p>Note: The key comparison is case-sensitive.</p> <p>Use the Check for a single value condition to execute actions based on whether a specific key contains the target value.</p>
File	<p>Use the following conditions to execute the action:</p> <ul style="list-style-type: none"> <li>• File date</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• File exists and File does not exist</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• File size</li> </ul> <p>This condition verifies if the specified file is larger, smaller, not the same, or the same as the size you specify.</p> <p>Enter the amount of time (in seconds) to wait for this condition to be true.</p>
Folder	Use the Folder exists or Folder does not exist condition to execute an action based on whether a folder exists.

Condition	Description
Image Recognition	<p>Use these conditions to verify whether:</p> <ul style="list-style-type: none"> <li>• Image file is found in the Image file or not.</li> <li>• Image file is found in the Window or not.</li> <li>• Window is found in the Image file or not.</li> <li>• Window is found in the Window or not.</li> </ul>
JavaScript	<p>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.</p>
Legacy automation	<p>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:</p> <ul style="list-style-type: none"> <li>• Whether Web control exists or not.</li> <li>• Whether Window control exists or not.</li> <li>• Whether Window control is active or not.</li> <li>• Whether Script is successful or not.</li> <li>• Whether Child window exists or not.</li> </ul>
List	<p>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.</p>
Number	<p>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.</p>
Ping	<p>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.</p>
Recorder	<p>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.</p>
Service	<p>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.</p>
String	<p>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.</p> <p>You can select the Match case option to only execute actions if the two strings have matching uppercase and lowercase letters.</p> <p>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</p>

Condition	Description
	<p>Carriage return option if you want to ignore the /r special character when you compare the text.</p> <p>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.</p> <p>See <a href="#">Example of using a conditional statement</a>.</p>
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.

## Example

### [Build a basic bot that uses a desktop application](#)

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.

## 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:

### Procedure

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](#) 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 Apply.

## 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 <a href="#">Using Find image in window action</a> .
Find window in window	See <a href="#">Using the Find window in window action</a> .

## 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.

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 click Apply and navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#).

# 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.

## Procedure

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 Window or Variable tab.
  - Click the Window tab to select the application window from the list.  
Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.
  - Click the Variable tab to insert an existing window variable to specify the title of the application window you want to use.
3. Click Capture region.  
The selected window appears.
4. 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.
5. In the Wait before capturing the image (ms) field, specify the delay (in milliseconds) before searching for the image.
6. 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, and .gif formats are supported.
7. In the Image occurrence field, enter a value to specify the occurrence of the target image on which you want to perform this action.
8. 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.
9. 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.
10. Select an option from the Action list to specify the action you want to perform on the matched image in the application window.
11. 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.

- 
12. Click Apply.

## 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.

### Procedure

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 Window or Variable tab.
  - Click the Window tab to select the application window from the list.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

- Click the Variable tab to insert an existing window variable to specify the title of the application window you want to use.

3. Click Capture region.  
The selected window appears.
4. 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.
5. 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, and .gif formats are supported.

6. 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).
7. Click Capture image to capture the target image.
8. Drag the mouse pointer over an area of the application window.  
The captured area appears in the Preview section.
9. In the Image occurrence field, enter a value to specify the occurrence of the target image on which you want to perform this action.
10. 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.

11. 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.
12. Select an option from the Action list to specify the action you want to perform on the matched image in the application window.
13. 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.
14. Click Apply.

## 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	Loads and displays 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.

Action	Description
Validate form	<p>Validates all the elements within the selected form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field for a specific form, which is validated when an event is triggered.</li> <li>Select the next event by creating or selecting a variable using the Assign the return value to a boolean variable field.</li> </ul> <p>Note: The Validate form action is not applicable to the Table and Rich Text Editor elements.</p>

The following actions are available at the element level:

Action	Description
Assign	<p>Assigns dynamic values to the Dropdown element of a form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Select the Dropdown element of the form from the Form element field, which is enabled when an event is triggered.</li> <li>Use Assign to set one of the following actions:           <ul style="list-style-type: none"> <li>Append: Specified values or variables are added to the selected Dropdown element.</li> <li>Overwrite: Specified values or variables replace the existing data in the selected Dropdown element.</li> </ul> </li> </ul>
Enable	<p>Enables the specified element of the selected form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Select a specific element of the form from the Form element field, which is enabled when an event is triggered.</li> </ul>
Disable	Disables the specified element of the selected form.
Get	<p>Retrieves the value from the specified element of the selected form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field and use the Form element to select a specific element of the form.</li> <li>Use the Returns the value drop-down menu to assign this value to a variable when an event is triggered.</li> </ul> <p><a href="#">Create a variable</a></p>
Set	<p>Assigns the user-defined or global variable to the selected element of the specified form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field and use the Form element to select a specific element of the form.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Use the Input value to assign a user-defined or system variable into this element when an event is triggered.</li> </ul>
Set focus	<p>Sets the focus on the selected element of a form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Use the Form element to select the specific element of the form and set the focus: <ul style="list-style-type: none"> <li>For form elements such as a text box, text area, number or date, the cursor appears on the element.</li> <li>For form elements such as a check box or radio button, the emphasis is on the first option.</li> </ul> </li> </ul>
Highlight	<p>Highlights the specified element of the selected form.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Use the Form element to select the specific element of the form to highlight it when an event is triggered.</li> <li>Use the Highlight Type drop-down menu to select one of the following: <ul style="list-style-type: none"> <li>Warning: Displays a warning alert on the specified form element.</li> <li>Error: Displays an error alert on the specified form element.</li> </ul> </li> </ul>
Unhighlight	Removes the highlight from the specified element of the selected form.
Change label	<p>Changes the label of the selected form element.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Use the Form element to select the specific element of the form for which the label must change when an event is triggered.</li> <li>Enter the name in New label field.</li> </ul>
Dynamic area	
Add row in Dynamic area	<p>Applies only to forms that have a Dynamic element. This action renders the selected form field as a single row when the bot starts.</p> <ul style="list-style-type: none"> <li>Select or insert a variable in the Form name field.</li> <li>Use the Dynamic area drop-down menu to select the dynamic element of the form.</li> <li>Use Append or Overwrite to add a row for the specified dynamic area.</li> <li>Use Add element to insert elements into the dynamic area. <ul style="list-style-type: none"> <li>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.</li> <li>Use the Label field to enter a name for the element.</li> <li>Click Add to add the element.</li> </ul> </li> </ul> <p>Note: You can add up to four elements.</p>
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](#)

### Actions in the IQ Bot (Preview) package

The package includes the following actions:

Action	Description
Document extraction	See <a href="#">Using Document Extraction action</a>
Validation	See <a href="#">Using Validation action</a>

- [Using Document Extraction action](#)

Use the Document Extraction action to process documents using TaskBots created in the Enterprise Control Room.

- [Using Validation action](#)

Use the Validation action to dynamically generate the form for validating a document against the learning instance.

## Using Document Extraction action

Use the Document Extraction action to process documents using TaskBots created in the Enterprise Control Room.

### Prerequisites

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.

### Procedure

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.

### Procedure

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 representative to request the IQ Bot Classifier package.  
Note: The package is currently supported only for English language.

## 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 <a href="#">Using Train Classifier action</a>
Classify	See <a href="#">Using Classify action</a>

- [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.

- [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.

## 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.

### Prerequisites

Ensure the action meets the following minimum requirements:

- Has at least two categories or subdirectories.
- A minimum of 12 pages per category (20 pages recommended).

If these minimum requirements are not met, an error message is displayed during bot runtime.

### Procedure

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:

- Training Optimization: Use the drop-down menu to select the type of training optimization. F1 score is selected by default.
  - 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.
  - OCR Settings: The Extract all text blocks and Extract text from images are enabled by default.
7. Click Apply to apply the action and save the bot.  
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.

### Prerequisites

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.

### Procedure

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](#)

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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

- 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 <a href="#">Using Process Documents action</a>

- [Using Process Documents action](#)

Use the action to process documents using TaskBots created in the Enterprise Control Room.

## Using Process Documents action

Use the action to process documents using TaskBots created in the Enterprise Control Room.

### Procedure

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](#)

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](#)

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.

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 IQ Bot Pre-processor package: [A-People Downloads page \(Login required\)](#).

After installation, you can locate the package in the Enterprise Control Room: Bots > Packages > All packages list in A2019.

## Actions in the IQ Bot Pre-processor package

The following table lists the actions used for processing image file:

Actions	Description
Concatenate image	See <a href="#">Using Concatenate images action</a>
Convert image to pdf	See <a href="#">Using Convert image to pdf action</a>
Edit image	See <a href="#">Using Edit image action</a>
Enhance image	See <a href="#">Using Enhance image action</a>
Orient image	See <a href="#">Using Orient image action</a>

The following table lists the actions used for extracting content from documents:

Actions	
Get barcodes	See <a href="#">Using Get barcodes action</a>
Get document info	See <a href="#">Using Get document info action</a>
Get page content	See <a href="#">Using Get page content action</a>

- [Using Concatenate images action](#)  
Use the Concatenate images action in the IQ Bot Pre-processor package to link two image files.
- [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.
- [Using Edit image action](#)  
Use the Edit image action in the IQ Bot Pre-processor package to resize an image file.
- [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.
- [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.
- [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.
- [Using Enhance image action](#)  
Use the Enhance image action in the IQ Bot Pre-processor package to enhance a selected image file.
- [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.

## Using Concatenate images action

Use the Concatenate images action in the IQ Bot Pre-processor package to link two image files.

### Procedure

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. Click Apply to apply the action and save the bot.  
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.

## Procedure

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 Apply to apply the action and save the bot.

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.

## Procedure

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. Click Apply to apply the action and save the bot.

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.

## Procedure

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 Apply to apply the action and save the bot.

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.

## Procedure

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 Apply to apply the action and save the bot.

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.

## Procedure

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 Apply to apply the action and save the bot.
- 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.

## Procedure

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 option and use the Effect type drop-down menu to select an enhancement. For example, select GRayscale to change the image file to monochrome, or select SHARPEN to enhance the image.
  7. Click Add.
  8. Click Apply to apply the action and save the bot.
- 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.

## Procedure

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 **Apply** to apply the action and save the bot.

When the bot runs successfully, the modified image file is saved in the specified output folder.

## 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 <a href="#">Download all documents action</a> .
Upload document	See <a href="#">Upload document action</a> .

## 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.

### Procedure

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.

### Prerequisites

- 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.

### Procedure

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.

### Next steps

To upload multiple files, see [Upload multiple files with IQ Bot using Loop action](#).

## 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.

## Procedure

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.

## Next steps

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.

## 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	<p>Closes the session.</p> <p>Specify the same session name from the Open action.</p>
Open	<p>Opens a JavaScript file.</p> <ul style="list-style-type: none"> <li>In the JavaScript session field, specify a session name. Use this same session name for other JavaScript actions.</li> <li>In the JavaScript, choose one of the following options:           <ul style="list-style-type: none"> <li>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.</li> <li>In the Manual input option, enter the JavaScript.</li> </ul> </li> </ul>
Run JavaScript	<p>Runs a function within the JavaScript.</p> <ul style="list-style-type: none"> <li>In the JavaScript session field, specify a session name. Use the same session name from the Open action.</li> <li>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.</li> <li>Optional: In the Assign the output to variable field, specify the variable.</li> </ul>

## 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> <p>The output is a string variable with the following value: {key1,value1}, {key2,value2}</p>
GetDecrementedException	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:getDecrementedException\$] [0]\$</pre> <p>The output of myNumber decreases by 1 with each iteration of the loop.</p>
GetIncrementedException	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:getIncrementedException.Number:toString\$</pre> <p>The output of myNumber increases by 1 with each iteration of the loop.</p>
GetKeystrokeCount	<p>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.</p>	<pre>\$KeyStroke-CharLength.LegacyAutomation:getKeystrokeCount.String:toNumber\$</pre> <p>The output is the average delay for each keystroke.</p>

Expression	Description	Use example
ListToString	Converts a list variable to a string variable.	<pre>{ \${listVar.LegacyAutomation:listToString\$}}</pre> <p>The output is a string variable with the following value: value1,value2,value3</p>
ListToTable	Converts a list variable to a table variable.	<pre>{ \${my-list-variable.LegacyAutomation:listToTable\$}}</pre> <p>The output is a table variable where each list value is cell in a single column.</p>
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>
ParseLegacyKeys	<p>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.</p> <p>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.</p>	<pre>\$Test.LegacyAutomation:parseLegacyKeys\$</pre>
TableToString	Converts a table variable to a string variable	<pre>{ \${tableVar.LegacyAutomation:tableToString\$}}</pre> <p>The output is a string variable with the following value: {value1,value2},{value3,value4}</p>

## 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	<p>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.</p> <ul style="list-style-type: none"> <li>• Select the list variable in which to add an item from the List variable list.</li> <li>• Select the variable that contains the value to add from the Item to be added list.</li> </ul> <p>Note: The variable must be of the same sub-data type as the other list items.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul> <p>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.</p>
Assign	<p>Assigns the value of the source list to the destination list variable.</p> <ul style="list-style-type: none"> <li>• Select the source list variable from the drop-down list or create a new list variable.</li> <li>• Select a list variable or create one to hold the output.</li> </ul>

Action	Description
Clear	Clears all items from the selected list variable.
Get item	<p>Retrieves a value at the specified position in a list and stores the output to a variable.</p> <ul style="list-style-type: none"> <li>Select the list variable from which you want to retrieve a value from the List variable list.</li> <li>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.</li> <li>Select a variable that you want to use to store the output from the Assign the output to variable list.</li> </ul>
Join items	<p>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.</p> <ul style="list-style-type: none"> <li>Select the list variable that you want to use from the List variable list.</li> <li>Specify the delimiter you want to use to separate values in the output in the Delimiter field.</li> <li>Select a variable that you want to use to store the output from the Assign the output to variable list.</li> </ul>
Remove item	<p>Removes an item from a list and assigns the output to a variable.</p> <ul style="list-style-type: none"> <li>Select the list variable from which you want to remove an item from the List variable list.</li> <li>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.</li> <li>Select a variable that you want to use to store the output from the Assign the output to variable list.</li> </ul>
Set item	<p>Sets an item at the specific position in a list and stores the output in a variable.</p> <ul style="list-style-type: none"> <li>Select the list variable in which you want to set a value from the List variable list.</li> <li>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.</li> <li>Select a variable that you want to use to store the output from the Assign the output to variable list.</li> </ul>
Size	<p>Retrieves the number of items in a list and assigns the output to a number variable.</p> <ul style="list-style-type: none"> <li>Select the list variable for which you want to retrieve the size from the List variable list.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Select a number variable that you want to use to store the output from the Assigns the number of items to variable list.</li> </ul>

Related reference

[Loop package](#)

[Variables overview](#)

## 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 <a href="#">Using Log To File action</a> .

## 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.

### Procedure

Follow these steps to log text into a file:

- In the Actions palette, double-click or drag the Log To File action from the Log To File package.
- In the File path field, specify the file location or variable.
- In the Enter text to log field, enter the text to log in the file.
- Select the Append timestamp check box to add a time stamp.
- 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.
- 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 Apply.

8. 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 <a href="#">Using Loop action</a> .
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 <a href="#">If package</a> .
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 <a href="#">If package</a> .

## 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 <a href="#">Using the For each row in CSV/TXT iterator</a> .
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 <a href="#">Using the For each row in table iterator</a> .
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 <a href="#">Using the For each mail in mail box iterator</a> .
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 <a href="#">Record variable</a> . 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. <ul style="list-style-type: none"> <li>• You must convert the values to perform non-string operations.</li> <li>• 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.</li> </ul> <p>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%.</p> <p>Recommendation: Use the Read cell value option as reading value from a cell for better performance than reading visible text.</p>

Iterator	Description
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 <b>name</b> key holds the file name and the <b>extension</b> key holds the file extension.
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	<p>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.</p> <p>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.</p>
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 <a href="#">Using Office 365 Calendar actions in a loop</a> .
For each row in worksheet (Office 365 Excel)	<p>Repeats the set of actions for each row that contains data in a worksheet.</p> <ul style="list-style-type: none"> <li>Provide the session name that you have used to open the worksheet.</li> <li>Specify whether to repeat the actions for all the rows or specific rows.</li> <li>You can assign the values in the current row to a record variable.</li> </ul>
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	<p>Use the Application is not running or Application is running condition to execute actions based on whether an application is running or not running.</p> <p>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.</p>
Boolean	<p>Use this condition to execute actions based on the value of a Boolean variable.</p> <p>Use this condition to compare the values of two Boolean variables or one Boolean variable to a selected Boolean value.</p>
Data table	<p>Use the Data table is empty condition to execute actions based on whether the specified table contains values.</p> <p>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.</p>
Datetime	<p>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.</p>
Dictionary	<p>Use this condition to repeat the set of actions based on whether the selected dictionary variable contains the specified key.</p> <p>Note: The key comparison is case-sensitive.</p>
File	<p>Use the following conditions to execute the action:</p> <ul style="list-style-type: none"> <li>• File date</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• File exists and File does not exist</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• File size</li> </ul> <p>This condition verifies if the specified file is larger, smaller, not the same, or the same as the size you specify.</p> <p>Enter the amount of time (in seconds) to wait for this condition to be true.</p>

While	Description
Folder does or does not exists	Use these conditions to repeat the set of actions based on whether a folder exists.
Image Recognition	Use these conditions to verify whether: <ul style="list-style-type: none"> <li>• Image file is found in the Image file or not.</li> <li>• Image file is found in the Window or not.</li> <li>• Window is found in the Image file or not.</li> <li>• Window is found in the Window or not.</li> </ul>
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: <ul style="list-style-type: none"> <li>• Whether Web control exists or not.</li> <li>• Whether Window control exists or not.</li> <li>• Whether Window control is active or not.</li> <li>• Whether Script is successful or not.</li> <li>• Whether Child window exists or not.</li> </ul>
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. <p>You can select the Match case option to only execute actions if the two strings have matching uppercase and lowercase letters.</p>

While	Description
	<p>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.</p> <p>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.</p> <p>See <a href="#">Example of using a conditional statement</a>.</p>
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.

- [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.

- [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.

- [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.

#### Related tasks

[Example of transferring data from CSV file to Excel worksheet](#)

[Example of entering data into a web form from a worksheet](#)

#### Related reference

[Record variable](#)

## 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.

### Procedure

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 <a href="#">Loop package</a> for the list of available options.
Select the While option to repeat the sequence of actions until a condition is met.	a) Select an option from the Condition list to specify the condition. b) 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.

3. Double-click or drag the actions to be repeated within the Loop.
4. 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.
5. Click Apply.

Watch the following video on how to use the Loop action:

Using 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.

### Prerequisites

First, open the CSV or text file. [Using the Open action for CSV/TXT file](#)

To use the For each row in CSV/TXT iterator in a Loop action, do the following:

### Procedure

1. Double-click or drag the Loop action from the Loop package in the Actions palette.
2. Select the For each row in CSV/TXT option from the Iterator list.
3. Enter the name of the session that you have used to open the CSV or text file in the Open action.
4. 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](#)

5. Click Apply.

## Next steps

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](#).

## 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.

### Prerequisites

First, retrieve the table values and store them to a table variable.

Example: [Example of extracting data from a web table](#)

To use the For each row in table iterator in a Loop action, do the following:

### Procedure

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 Apply.

## Next steps

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](#).

Use the following examples to learn how to use the Message box action when building automations.

- [Build a Go be Great bot](#)

Build a basic TaskBot using a Message Box action and a variable.

- [Build a basic bot that uses a desktop application](#)

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.

### Procedure

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 Apply.

## 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. <ul style="list-style-type: none"> <li>• If the score is greater than 0.6, the sentiment is Positive.</li> <li>• If the score is in the 0.2 through 0.6 range, the sentiment is Neutral.</li> <li>• If the score is less than 0.2, the sentiment is Negative.</li> </ul> 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 <a href="#">Using the Click action</a> .
Move	See <a href="#">Using the Move action</a> .

Action	Description
Scroll	See <a href="#">Using the Scroll action</a> .

## 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 click Apply and navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#).

## 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.

### Procedure

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. Select either the Screen, Window, or Variable tab to specify the window in which to capture the mouse click:
  - Click the Screen tab to capture coordinates on the device screen.
  - Click the Window tab to capture coordinates in the application window you select from the list.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

Note: It is recommended to use the Window option because screen sizes can change, which distorts the captured coordinates.

- Click the Variable tab to insert an existing Window variable..
3. Click Capture coordinate.  
The selected window appears.
  4. 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.
  5. In the Button option, specify the button to click.  
Choose from Left Button, Right Button, or Middle Button.
  6. In the Event option, specify the event.  
Choose from Click, Double click, Button up, or Button down.
  7. Click Apply.
  8. Click Save.

# Using the Move action

Use the Move action to simulate moving the mouse pointer from one location to another.

## Procedure

Follow these steps to add a Move action:

1. In the Actions palette, double-click or drag the Move action from the Mouse package.
2. In the Mouse from and Mouse to fields, specify the X and Y coordinates.
3. Click Capture coordinate to capture the starting point location.
4. Click Capture coordinate to capture the end point location.
5. Optional: In the Delay in milliseconds field, specify the total duration of the movement in milliseconds.
6. Click Apply.
7. Click Save.

# Using the Scroll action

Use the Scroll action to simulate scrolling the mouse wheel up or down.

## Procedure

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 Apply.
6. 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	<p>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, <math>(3*4)+5</math> or <math>(\\$Variable2*\\$Variable3)/\\$Variable1</math>.</p> <ul style="list-style-type: none"> <li>Enter a number or select a predefined Number variable.</li> <li>Select a predefined number variable or create a new one to hold the output.</li> </ul>
Decrement	<p>Decrements (decreases by set intervals) a number by a user-specified value.</p> <ul style="list-style-type: none"> <li>Enter a number or select a predefined Number variable.</li> <li>Enter the decrement value or select a predefined Number variable.</li> <li>Select a predefined number variable or create a new one to hold the output.</li> </ul>
Increment	<p>Increments (increases by set intervals) a number by a user-specified value.</p> <ul style="list-style-type: none"> <li>Enter a number or select a predefined Number variable.</li> <li>Enter the increment value, the value must be greater than zero or select a predefined Number variable.</li> <li>Select a predefined number variable or create a new one to hold the output.</li> </ul>
Random	<p>Generates a random integer from a user-specified range and assigns it to a number variable.</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Select a predefined number variable or create a new one to hold the output.</li> </ul>
To string	<p>Converts a user-specified number to a string.</p> <ul style="list-style-type: none"> <li>Enter a number or select a predefined Number variable.</li> <li>Enter the amount of digits after the decimal.</li> </ul> <p>To remove all the digits after the decimal, leave the default value of 0.</p> <ul style="list-style-type: none"> <li>Assign the output to a String variable. You can use prompt-assignment during building and testing of the bot.</li> </ul> <p>Important: Ensure that you reassign the values from prompt-assignment to a user-created variable before deploying the bot into production.</p>

## 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 <a href="#">Using Capture image by path action</a> .
Capture image by url	See <a href="#">Using Capture image by URL action</a> .
Capture window	See <a href="#">Using Capture window action</a> .
Capture area	See <a href="#">Using Capture area action</a> .

## 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 click Apply and navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#).

## 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.

### Procedure

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 Apply.
9. 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.

### Procedure

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 Apply.
9. 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.

### Procedure

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.
3. In the Wait before capturing the image (ms) field, specify the delay time.
4. 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.
5. Select the Trim the captured text check box to trim the extra spaces.
6. 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.
7. 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.
8. In the Assign value to variable list, select a string variable.
9. Click Apply.
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.

### Procedure

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. Click Variable tab to create a new string variable.
3. Specify the X, Y, Width, and Height coordinates.
4. Click Capture region.

- The bot captures text from the visible area of the screen even if the target area is below the visible screen.
5. In the Wait before capturing the image (ms) field, specify the delay time.
  6. 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.
  7. Select the Trim the captured text check box to trim the extra spaces.
  8. 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.
  9. 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.
  10. In the Assign value to variable list, select a string variable.
  11. Click Apply.
  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](#).  
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](#).

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 <a href="#">Loop package</a> . <ul style="list-style-type: none"> <li>• Provide the session name that you used in the Connect action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>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.</li> </ul>
Add attendees	<p>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 <a href="#">Loop package</a>.</p> <ul style="list-style-type: none"> <li>Provide the session name that you used in the Connect action.</li> <li>Enter the attendee emails into the Required or Optional fields. Separate each email with a comma.</li> </ul>
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 <a href="#">Loop package</a> .
Connect	<p>Establishes a connection with the Office 365 server using your organization's client ID and tenant ID, and user credentials.</p> <p>See <a href="#">Using the Connect action</a>.</p>
Create meeting	See <a href="#">Using the Create Meeting action</a> .
Delete attendees	<p>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 <a href="#">Loop package</a>.</p> <ul style="list-style-type: none"> <li>Provide the session name that you used in the Connect action.</li> <li>Select an option to delete: meeting or attendees. To delete attendees, provide the email addresses of the attendees, separated by commas.</li> </ul>
Delete meeting information	<p>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 <a href="#">Loop package</a>.</p> <ul style="list-style-type: none"> <li>Provide the session name that you used in the Connect action.</li> <li>Select the meeting information to delete. The options are: <ul style="list-style-type: none"> <li>Title</li> <li>Location</li> <li>Agenda</li> <li>Reminder</li> <li>Recurrence</li> <li>Is all day</li> </ul> </li> </ul>
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.

Action	Description
Get available meeting slot(s)	See <a href="#">Using the Get available meeting slots action</a> .
Modify meeting	<p>Modifies information for a meeting. Use this action within a Loop action to repeat this operation for each meeting in the calendar. See <a href="#">Loop package</a>.</p> <ul style="list-style-type: none"> <li>Provide the session name that you used in the Connect action.</li> <li>Modify any of the following: <ul style="list-style-type: none"> <li>Meeting start or end date.</li> <li>Convert the meeting to all day.</li> <li>Revise the meeting title.</li> <li>Revise the agenda.</li> <li>Update the location.</li> <li>Update the reminder.</li> <li>Update the recurrence, frequency, start date, and end date.</li> </ul> </li> </ul>
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 <a href="#">Loop package</a> .

## 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.

### Prerequisites

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](#).

To create a meeting, do the following:

### Procedure

- Enter the session name that you used in the Connect action.
- Enter the calendar name.  
This field is case-sensitive.  
The prepopulated value is Calendar; this is the default Office 365 setting.
- Specify the meeting start date and time.  
Select a DateTime variable from the drop-down list.
- Specify the meeting end date and time.  
Select a DateTime variable with a value that is the same or after the start time.
- 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.
- 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.

### Procedure

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 Apply.

## Using Office 365 Calendar actions in a loop

You must use certain Office 365 Calendar actions within a Loop action.

### Prerequisites

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](#).

### Procedure

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.

## Prerequisites

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](#).
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](#).

## Procedure

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 Apply.

## 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	
	<a href="#">openid</a>
	<a href="#">offline_access</a>
	<a href="#">User.ReadWrite.All</a>
	<a href="#">Group.Read.All</a>
	<a href="#">Group.ReadWrite.All</a>
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](#).  
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](#).
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	<p>Perform operations related to cell and range operations, such as append, delete, format, get properties, and insert.</p> <p>See <a href="#">Cell operations</a></p>
Row and column	<p>Perform operations related to column and row operations such as autofit, delete, and read.</p> <p>See <a href="#">Column/Row operations</a>.</p>
Table	<p>Perform operations related to the table operations such as create, delete, filter, get properties, rename, and sort. See <a href="#">Table operations</a>.</p>
Workbook	<p>Automate opening, closing, and creating a workbook.</p> <p>See <a href="#">Workbook operations</a>.</p>
Worksheet	<p>Perform operations related to worksheet operations, such as activate, delete, find, get worksheet names, hide, retrieve worksheet count, and show.</p> <p>See <a href="#">Worksheet operations</a>.</p>

## 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	<p>Deletes the Active cell or a Specific cell from the current worksheet.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• If you select Specific cell, enter the cell location. For example <b>A1</b></li> <li>• Select one of the following options:           <ul style="list-style-type: none"> <li>• Shift cells left: Deletes the specified cell and shifts the cell one position to left.</li> <li>• Shift cells up: Deletes the specified cell and shifts the cell one position up.</li> </ul> </li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Entire row: Deletes the entire row that contains the cell that you have specified.</li> <li>Entire column: Deletes the entire column that contains the cell that you have specified.</li> </ul>
Delete range	<p>Deletes a specific range of cells.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the cell range. For example A1 : B4 . This deletes an area consisting of the first four rows by the first two columns.</li> <li>Use the radio buttons to specify whether to shift the cells up or left. <ul style="list-style-type: none"> <li>Shift cells up: Deletes the specified cells and shifts the cells up by the number of deleted.</li> <li>Shift cells left: Deletes the specified cells and shifts the cells left by the number of deleted.</li> </ul> </li> </ul>
Format cell	See <a href="#">Using the Format cell action</a> .
Get cell	<p>Retrieves the value of a cell.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell or Specific cell option and enter the cell location.</li> <li>Assign the output to a String variable. To perform mathematical operations, convert the string to a number. See the <a href="#">String &gt; Convert action</a>.</li> </ul>
Get cell/text color	See <a href="#">Using the Get cell/text color action</a> .
Get multiple cells	<p>Retrieves the value(s) of multiple cells within a worksheet and assigns the output to a variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Multiple cells or All cells option. If you select Multiple cells, enter the cell range. A1 : D1 . This retrieves the values of the first four cells in the top row.</li> <li>Assign the output to a String variable. To convert the string to a number, see the <a href="#">String &gt; Convert action</a>.</li> </ul>
Go to cell	<p>Moves the cursor to a specific cell in the worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select from the following options: <ul style="list-style-type: none"> <li>Specific cell: Moves to the specified cell address.</li> <li>One cell to the left: Moves one cell left.</li> <li>One cell to the right: Moves one cell right.</li> <li>One cell above: Moves one cell up.</li> <li>One cell below: Moves one cell down.</li> <li>Beginning of row: Moves to the first cell in the same row.</li> <li>End of row: Moves to the last cell that contains data in the same row.</li> <li>Beginning of column: Moves to the first cell in the same column.</li> </ul> </li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>• End of column: Moves to the last cell that contains data in the same column.</li> </ul>
Insert cell	<p>Inserts a value to the Active cell or a Specific cell in the current worksheet without overwriting the existing value.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• If you select Specific cell, enter the cell location. For example, A1</li> <li>• After inserting the cell, you can: <ul style="list-style-type: none"> <li>• Shift cells down: Shifts the existing values down by the specified number of rows.</li> <li>• Shift cells right: Shifts the existing values right by the specified number of columns.</li> </ul> </li> </ul>
Insert range	<p>Inserts the range into the current worksheet without overwriting the existing value.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Enter the cell range. For example A1:B4. This inserts a range of cells consisting of the first two rows by the first two columns.</li> <li>• After inserting the cell, you can: <ul style="list-style-type: none"> <li>• Shift cells down: Shifts the existing values down by the specified number of rows.</li> <li>• Shift cells right: Shifts the existing values right by the specified number of columns.</li> </ul> </li> </ul>
Paste cell	<p>Copies a value from a cell and pastes to a specified cell. If there is a value in the destination cell, the action will overwrite the value.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• 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.</li> <li>• Enter the destination cell address to paste the value. For example, B3.</li> </ul>
Read cell format	<p>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.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Select the Active cell or Specified cell option to specify the cell from which to read the cell format. If you have selected the Specified cell option, specify the address of the cell in the field.</li> <li>• Select a String variable to store the cell format from the Assign the output to variable list.</li> </ul>
Read cell formula	<p>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.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• 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.</li> <li>• Select a string variable to store the name of the formula from the Assign the output to variable list.</li> </ul>

Action	Description
Set cell	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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 a range. For example, to set a value of 5 on all cells in the second row and from the first column through third column, enter <b>A2 : C2</b>.</li> <li>Enter the value to set in the Cell value field.</li> </ul>
Set cell color	<p>Sets a color to the background or text of the Active cell or Specific cell.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell, Specified cell, or Cell range option to specify the cell in which to apply the color. If you have selected the Specified cell option, specify the address of the cell in the field.</li> <li>Select which to apply the color to: the Cell or Text within cell.</li> <li>Enter the value to set in the Cell value field. Use either the color name or the hex value of color names and corresponding hex values, see <a href="#">Frequently used cell colors</a>.</li> </ul>
Set cell formula	<p>Sets the formula of the specified cell.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the Active cell, Specified cell, or Cell range option to specify the cell in which to apply the formula. If you have selected the Specified cell option, specify the address of the cell in the field.</li> <li>Enter the value to set in the Cell formula field without an "=".</li> </ul>

## 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:

### Procedure

- Double-click or drag the Format cell action.
- Specify the name of the session in which you want to perform the action in the Session name field.
- Select the Active cell, Specific cell, or Multiple cells option and provide cell location or cell range, as necessary.
- 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](#).
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 any of the following operations:
    - Merge and center
    - Merge across
    - Merge cells
    - Unmerge
  8. Click Apply.

## Frequently used cell colors

### 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:

### Procedure

1. Double-click or drag the Get cell/text color action.
  2. Specify the name of the session in which you want to perform the action in the Session name field.
  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 Apply.
- 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 the name of the session used to open the current workbook with the Open action.
Autofit rows	Adjusts the height of the rows in the worksheet in the specified session. Use the name of the session used to open the current workbook with the Open action.
Delete row/column	See <a href="#">Using Delete action for rows or columns</a> .
Get row count	Retrieves the number of rows that contain data in the worksheet. <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Assign the output value to a Number variable. To convert the variable to a String variable, see the <a href="#">Number &gt; Convert</a> action.</li> </ul>

Actions	Description
Insert row/ column	See <a href="#">Using Insert action for rows or columns</a> .
Read column	<p>Extracts data from a column and stores it in a List variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the From active cell or From specific cell option to specify the starting point.</li> <li>You can also select the Read full column option to extract data for the entire column.</li> <li>Assign the output value to a List variable.</li> </ul>
Read row	<p>Extracts data from a row and stores it in a Record variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the From active cell or From specific cell option to specify the starting point.</li> <li>You can also select the Read full row option to extract data for the entire row.</li> <li>Assign the output value to a Record variable.</li> </ul>

## 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:

### Procedure

- Double-click or drag Office 365 Excel > Delete.
- Specify the name of the session in which you want to perform the action in the Session name field.
- Select one of the following:
  - Row operations
    - 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.
    - Select the Delete Row(s) by option to delete all of the cells in either:
      - c) the row of the active cell.
      - d) 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
    - 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:
- c) the column of the active cell.
  - d) 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 Apply.

## Next steps

# 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:

## Procedure

1. Double-click or drag Office 365 Excel > Insert.
2. Specify the name of the session in which you want to perform the action in the Session name field.
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:
      - c) the row of the active cell.
      - d) 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:
      - c) the column of the active cell.
      - d) 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 Apply.

## Next steps

# 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	<p>Creates a new table in the specified table range.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the table name.</li> <li>Enter the cell range in which to create the table. For example, A1:D4.</li> <li>Optional: Select the Table has headers option to establish the first row as the header row.</li> </ul>
Delete table	<p>Deletes the table in the active worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the table name.</li> </ul>
Get table column	<p>Retrieves the column values of a specified table and column index, and assigns the values to a List variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the table name.</li> <li>Enter the column index. For example, enter 5 to indicate the fifth column from the left.</li> <li>Select a List variable to store the values.</li> </ul>
Get table names	<p>Retrieves the names of all the tables in a workbook and assigns them to a List variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Optional: Select whether to specify a sheet either by index or name.</li> <li>Select a List variable to store the values.</li> </ul>
Get table row	<p>Retrieves the row values of a specified table and row index, and assigns the values to a Record variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the table name.</li> <li>Enter the row index. For example, enter 5 to indicate the fifth row from the top.</li> <li>Select a Record variable to store the values.</li> </ul>
Get table row count	<p>Retrieves the row count of a specified table and assigns the values to a number variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> </ul>

Actions	Description
	<ul style="list-style-type: none"> <li>Enter the table name.</li> <li>Select a Number type variable to store the values. To convert the variable to a String type variable, see the <a href="#">Number &gt; Convert</a> action.</li> </ul>
Rename table	<p>Renames a table.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the current table name.</li> <li>Enter a new table name.</li> </ul>

## 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 the name of the session used to open the current workbook with the Open action.
Create workbook	<p>Creates a new workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>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.</li> </ul> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter  <b>Accounts/SalesReport.xlsx</b></p>
Open	See <a href="#">Using the Open action</a> .

## 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:

## Procedure

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 Apply.

## 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 <a href="#">Using the Copy worksheet action</a> .
Create worksheet	<p>Adds an empty sheet in the current workbook.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• Enter a Worksheet name of up to 31 characters. The name cannot contain the following characters: \ / ? * [ ]</li> </ul>
Delete worksheet	<p>Deletes a spreadsheet from the current workbook.</p> <ul style="list-style-type: none"> <li>• Enter the name of the session used to open the current workbook with the Open action.</li> <li>• 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 <code>3</code> in the field.</li> </ul> <p>Note: You can delete a worksheet only if the workbook contains more than one worksheet.</p>

Actions	Description
Get current worksheet name	<p>Retrieves the name of the currently active worksheet.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select a string variable that you want to use to store the name of the worksheet from the Assign the output to variable list.</li> </ul>
Get worksheet names	<p>Retrieves the names of all the worksheets in the workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select a list variable to store the worksheet names from the Assign the output to variable list.</li> </ul>
Hide worksheet	<p>Hides a worksheet from the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the name of the worksheet to hide in the Enter worksheet name to hide field.</li> </ul> <p>Note: You can hide a worksheet only if the workbook contains more than one worksheet.</p>
Rename worksheet	<p>Renames a worksheet in the current workbook.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify the index number or name of the worksheet to rename in the Sheet by Index or Sheet by Name field.</li> </ul> <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 <b>3</b> in the field.</p> <p>Note: You cannot rename the worksheet if a worksheet with the same name already exists in the workbook.</p> <ul style="list-style-type: none"> <li>Enter the new worksheet name that is under 31 characters.</li> </ul>
Retrieve sheet count	<p>Gets the number of sheets available in the current workbook and stores it in a number variable.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Select the appropriate option to specify whether to include the hidden worksheet or not and assign the count to a variable.</li> </ul>
Show worksheet	Shows the hidden worksheet.

Actions	Description
	<ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Enter the Worksheet name.</li> </ul>
Switch to sheet	<p>Activates a particular sheet in a Microsoft Excel file.</p> <ul style="list-style-type: none"> <li>Enter the name of the session used to open the current workbook with the Open action.</li> <li>Specify whether to activate the Sheet by Index (numerical value) or Sheet by Name.</li> </ul>

## 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.

### Prerequisites

Open the workbook(s) containing the source and target worksheets. See [Using the Open action](#).

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:

### Procedure

- Double-click or drag the Copy worksheet action.
- Enter the name of the session that you used to open the destination workbook in the Open action.
- 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.
- Enter the name of the session that you used to open the source workbook in the Open action.
- If the workbook contains more than one worksheet, mark the Specific Sheet option, then enter the index number or name of the destination worksheet.
- Click Apply.

## 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](#).

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](#).

The One Drive package includes the following actions:

Action	Description
Check permission	<p>Checks for read, write, or delete permission for a file or folder in your OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file or folder name and path, file or folder link, or select a predefined string variable.</li> <li>Specify which permission type to verify: Read or Read &amp; Write.</li> <li>Select a predefined Boolean type variable to hold the output, or click the icon on the right to create a new variable.</li> </ul> <p>The Boolean type variable will provide a true (user has permission) or false (user does not have permission) response.</p>
Connect	<p>Establishes a connection with the Office 365 server using your organization's client ID and tenant ID, and user credentials.</p> <p>See <a href="#">Using the Connect action</a>.</p>
Copy file or folder	<p>Copies a file or folder from one folder to another in your OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Select whether to copy a file or folder.</li> <li>Provide the source and destination file/folder names and paths or file/folder link. Either enter the values or insert a string variable.</li> </ul>

Action	Description
	<p>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter  <b>/Accounts/SalesReport.xlsx</b></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
Create folder	<p>Creates a folder in a specific directory in your OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Enter the parent folder name and path, or folder link. Either enter the values or insert a string variable.</li> </ul> <p>To obtain the folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter  <b>/Survey</b>  <b>Results/Q</b>  <b>1</b></p> <ul style="list-style-type: none"> <li>Enter the new folder name. Either enter the values or insert a string variable.</li> </ul>
Delete file or folder	<p>Deletes a file or folder in a specific directory in your OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Select whether to delete a file or folder.</li> <li>Provide the name and path, or file or folder link. Either enter the values or insert a string variable.</li> </ul> <p>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter  <b>/Accounts/SalesReport.xlsx</b></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p>
Download file	Downloads a file from a specific directory in your OneDrive.

Action	Description
	<ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file name and path, or file link. Either enter the values or insert a predefined string variable.</li> </ul> <p>To obtain the file link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter  <b>/Accounts/SalesReport.xlsx</b></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p> <ul style="list-style-type: none"> <li>Enter the destination folder path or select a predefined string variable.</li> <li>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.</li> </ul>
Export as PDF	<p>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.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file name and path, or file link. Either enter the values or insert a predefined string variable.</li> </ul> <p>To obtain the file link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter  <b>/Accounts/SalesReport.xlsx</b></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p> <ul style="list-style-type: none"> <li>Enter the export folder name and path or select a predefined string variable.</li> <li>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.</li> </ul>
Find files and folders	<p>Finds files and folders in a specific directory in your OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>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.</li> </ul> <p>To obtain the folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter</p>

Action	Description
	<p>/Survey</p> <p style="text-align: right;">Results/Q</p> <p>1</p> <p>.</p> <ul style="list-style-type: none"> <li>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 <code>*.docx</code> in the Specific file (or folder) field.</li> <li>Assign the output to a table variable.</li> </ul> <p>The variable will hold the following file or folder details: Name, ID, CreatedBy, CreationDate, LastModifiedBy, LastModificationDate, and ParentFolderPath.</p>
Get file or folder information	<p>Retrieves information for a specific file or folder from OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file or folder name and path, or file/folder link. Either enter the values or insert a string variable.</li> </ul> <p>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter</p> <p style="background-color: #f0f0f0;"><code>/Accounts/SalesReport.xlsx</code></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p> <ul style="list-style-type: none"> <li>Assign the output to a record variable.</li> </ul> <p>The variable will hold the following file or folder details: Name, ID, CreatedBy, CreationDate, LastModifiedBy, LastModificationDate, and ParentFolderPath.</p>
Move file or folder	<p>Moves a file or folder from one folder to another in OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Select whether to move a file or folder.</li> <li>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.</li> </ul> <p>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter</p>

Action	Description
	<p style="background-color: #e0e0e0;"><code>/Accounts/SalesReport.xlsx</code></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>
Rename file or folder	<p>Renames a file or folder in a specific directory in OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Select whether to rename a file or folder.</li> <li>Provide the current and new file or folder names, or file/folder link. Either enter the values or insert a string variable.</li> <li>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></li> <li>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.</li> </ul>
Restore last version	<p>Restores a file to the last version. If you restore a file to its previous version, you will lose the current version.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file name and path, or file link. Either enter the values or insert a predefined string variable.</li> </ul> <p>To obtain the file or folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a file named SalesReport.xlsx, located in the Accounts folder, enter</p> <p style="background-color: #e0e0e0;"><code>/Accounts/SalesReport.xlsx</code></p> <p>Note: The forward slash that indicates that a file or folder is located in the root directory is optional.</p>
Upload file	<p>Uploads a file to a specific directory in OneDrive.</p> <ul style="list-style-type: none"> <li>Enter the user session that you provided in the Connect action.</li> <li>Provide the file name and path on the local directory. Either enter the values or insert a predefined string variable.</li> </ul> <p>For example,</p> <p style="background-color: #e0e0e0;"><code>D:/Mydata/HR/EmployeeSurvey.xlsx</code></p>

Action	Description
	<ul style="list-style-type: none"> <li>Provide the upload folder name and path, or folder link. Either enter the values or insert a string variable.</li> </ul> <p>To obtain the folder link, copy the link generated from <a href="#">Share OneDrive files and folders</a></p> <p>For example, to perform this action on a folder named Q1, located in the Survey Results folder, enter</p> <pre>/Survey     Results/Q 1</pre> <ul style="list-style-type: none"> <li>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.</li> </ul>

## 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.

### Procedure

To perform an action on every file in a folder, do the following steps:

- Double-click or drag One Drive > Find files and folders.
- Provide your username with either a credential variable or an unencrypted value.
- Enter the file path of the folder in which to perform the search.
- 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.
- 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.
- Click Apply.
- Double-click or drag the Loop action.
- Select the For each row in table iterator.
- Select the table variable holding the output from step 5.
- Select or create a record variable to temporarily hold each row.
- Click Apply.

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.

0. Double-click or drag Outlook > Download file.
1. Provide your username with either a credential variable or an unencrypted value.
2. 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]}`
3. Enter the path to the folder where to download the files.
4. Click Apply.
5. 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 <a href="#">Using the Decrypt document action</a> .
Encrypt document	See <a href="#">Using the Encrypt document action</a> .
Extract image	See <a href="#">Using the Extract image action</a> .
Extract text	See <a href="#">Using the Extract text action</a> .
Merge documents	See <a href="#">Using the Merge documents action</a> .
Split document	See <a href="#">Using the Split document action</a> .

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](#).

## Using the Encrypt document action

Use the Encrypt document action to encrypt a PDF file.

## Procedure

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](#).
9. Click Apply.
10. Click Save.

Related tasks

[Using the Decrypt document action](#)

## Using the Extract text action

Use the Extract text action to extract text from a PDF file and save it as a text file.

## Procedure

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](#).
9. Click Apply.
10. Click Save.

## Using the Extract image action

Use the Using Extract image action to save a PDF file as an image.

### Procedure

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.
    - b) True color (32 bits)
    - c) True color (24 bits)
    - d) High color (16 bits)
    - e) 56 color (8 bits)
    - f) 16 color (4 bits)
    - g) 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](#).
12. Click Apply.
13. 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.

## Procedure

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](#).
7. Click Apply.
8. Click Save.

Related tasks

[Using the Encrypt document action](#)

## Using the Merge documents action

Use the Merge documents action to merge multiple PDF files into a single PDF file.

## Procedure

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, 2**

in 11.x, the output was pages 1,2,2,3. In A2019, that input generates the output of pages 1,2,3,2.

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 Apply.
12. Click Save.

## Using the Split document action

Use the Split document action to split a PDF file into multiple files.

### Procedure

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](#).

9. Click Apply.

10. 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 (passphrase) and asymmetric (public/private keys):

- PGP Passphrase: Requires a passphrase to encrypt and decrypt files.
- PGP Public/Private Key: Requires PGP public and private key files 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	<p>Creates a pair of public and private encryption keys.</p> <ul style="list-style-type: none"> <li>In the Location to save public key file field, specify the path to the text file where to save the public key.</li> <li>In the Location to save private key file field, specify the path to the text file where to save the private key.</li> <li>Optional: In the Password to protect private key file field, select a credential variable or enter a value.</li> <li>Optional: Select the Overwrite Files check box to replace files with the same name.</li> </ul>
Decrypt files	Decrypts encrypted files. See <a href="#">Using the Decrypt files action</a>
Encrypt files	Encrypts files to enable users to send them over the internet securely. See <a href="#">Using the Encrypt files action</a>

## Using the Decrypt files action

Use the Decrypt files action to retrieve the contents of encrypted files and folders.

### Procedure

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 Apply.

# Using the Encrypt files action

Use the Encrypt files action to prepare files and folders to be shared securely.

## Prerequisites

To encrypt the files or folder using a public key, create a public-private key pair using the Create keys action.

## Procedure

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 Apply.

## 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	<p>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.</p> <p>Select any of the following tabs to specify the location of the media file:</p> <ul style="list-style-type: none"> <li>Control Room file: Use a file that is available on the Enterprise Control Room.</li> <li>Desktop file: Use a file that is available on a device.</li> <li>Variable: Use a file variable to specify the file location.</li> </ul>

## 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

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 and 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	<p>Creates a process.</p> <ul style="list-style-type: none"> <li>• In the Select Process field, select or upload your process.</li> <li>• Specify your variable in the Dictionary or Variable field.           <ul style="list-style-type: none"> <li>• Dictionary: Input your variable information in the Type, Key, and Value fields.</li> </ul> </li> <li>• Optional: In the Add field, add more dictionary variables.           <ul style="list-style-type: none"> <li>• Variable: Enter your custom variable.</li> </ul> </li> <li>• Optional: In the Assigned the Request ID to field, assign a new variable.</li> </ul>

## 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	<p>Prompts the user to input a value.</p> <ul style="list-style-type: none"> <li>• In the Prompt window caption field, enter a window caption.</li> <li>• In the Prompt message field, enter a message.</li> <li>• In the Assign the value to a variable field, specify a list variable.</li> </ul>
For folder	<p>Prompts the user to choose a folder.</p> <ul style="list-style-type: none"> <li>• In the Prompt window caption field, enter a window caption.</li> <li>• In the Prompt message field, enter a message.</li> <li>• In the Assign the value to a variable field, specify a variable.</li> </ul>

Action	Description
For value	<p>Prompts the user to enter a value.</p> <ul style="list-style-type: none"> <li>In the Prompt window caption field, enter a window caption.</li> <li>In the Prompt message field, enter a message.</li> <li>In the Assign the value to a variable field, specify a variable.</li> </ul>
For yes/no	<p>Prompts the user to choose a Yes/No response.</p> <ul style="list-style-type: none"> <li>In the Prompt window caption field, enter a window caption.</li> <li>In the Prompt message field, enter a message.</li> <li>In the Assign the value to a variable field, specify a variable.</li> </ul>

Watch the following video on how to use the Prompt actions:

Using Prompt actions

Related reference

[Message box package](#)

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:

- 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.
- 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.
- 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 Python wrapper log, navigate to C:\ProgramData\AutomationAnywhere\BotRunner\Logs\python3wrapper.log. This file stores data on the Python code execution and 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	<p>Closes the session.</p> <p>Specify the same session name from the Open action.</p> <p>Important: It is mandatory to close the session after the script is executed.</p>
Execute function	<p>Executes a function within the Python Script.</p> <ul style="list-style-type: none"> <li>In the Python session field, specify a session name. Use the same session name from the Open action.</li> <li>Optional: Specify the function name to run and the arguments to pass to the function.</li> </ul> <p>Note: The interface allows you to select only one argument. Use a list variable to concatenate multiple arguments into one variable.</p> <ul style="list-style-type: none"> <li>Optional: In the Assign the output to variable field, specify the variable.</li> </ul> <p>For an example, see <a href="#">Example of using Python script to join a list</a>.</p>
Execute script	<p>Executes a script within the Python Script.</p> <ul style="list-style-type: none"> <li>In the Python session field, specify a session name. Use the same session name from the Open action.</li> <li>Optional: In the Assign the output to variable field, specify the variable.</li> </ul> <p>For an example, see <a href="#">Create a PDF using Python script</a>.</p>
Open	<p>Opens a Python Script file.</p> <ul style="list-style-type: none"> <li>In the Python session field, specify a session name. Use this same session name for other Python Script actions.</li> <li>In the Python field, choose one of the following options:           <ul style="list-style-type: none"> <li>In the Import existing file option, select an existing Python Script file.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>In the Manual input option, enter the Python Script.</li> </ul> </li> <li>In the Python runtime version field, select 2 or 3 to specify the runtime version.</li> </ul> <p>Note: Select the runtime version based on the version of Python installed on the device.</p>

## Resources

To learn more, see [Training - Write inline scripts in a bot](#). This course introduces you to new features in the Python Script command.

Note: You must log in with a registered A-People Community account to access the course.

- [Create a PDF using Python script](#)  
Build a bot that runs Python script from a file and generates a PDF.

## Create a PDF using Python script

Build a bot that runs Python script from a file and generates a PDF.

### Prerequisites

- 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](#).

### Procedure

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:
- Double-click or drag the Python Script > Open.
  - Select the Import existing file option.
  - Click Browse to select the .py file you created in Step 1.
  - Click Apply.
4. Use a Python Script > Execute script action to tell the bot to run the script:
- Double-click or drag Python Script > Execute script.
  - Click Apply.
5. Close the script execution session with a Python Script > Close action:
- Double-click or drag Python Script > Close.
  - Click Save.
6. Click the Run icon.  
The bot creates a PDF on the desktop with the text Go Be Great!.

To review the Python wrapper log, navigate to C:\ProgramData\AutomationAnywhere\BotRunner\Logs\python3wrapper.log. This file stores data on the Python code execution and 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](#). For a common use case, see [Example of entering data into a web form from a worksheet](#).

To record a process consisting of multiple steps, see [Record a task with the Universal Recorder](#). To learn more about Universal Recorder capabilities, see [Universal Recorder overview](#).

## 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 [Objects and actions](#).

## 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 click Apply and navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#).

## 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](#).

Example: [Example of extracting data from a web table](#)

## Objects and 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. Refer to the table below for the objects and their possible actions.

Object	Actions
Button	<ul style="list-style-type: none"> <li>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.</li> <li>Click</li> <li>Left click: use this action if the Click action does not work during Runtime.</li> <li>Right click</li> <li>Double click</li> </ul>
Checkbox	<ul style="list-style-type: none"> <li>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.</li> <li>Get status: retrieves whether the check box is selected. Returns checked or unchecked.</li> <li>Check</li> <li>Uncheck</li> <li>Toggle: switches the check box to the opposite status. For example, if the check box is checked, use the Toggle action to clear it.</li> <li>Left click: use this action if the Toggle action does not work during Runtime.</li> <li>Right click</li> <li>Double click</li> </ul>
Client	<ul style="list-style-type: none"> <li>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.</li> <li>Get all children names</li> <li>Get all children values</li> <li>Set text: enters text into the UI object. It supports <a href="#">Credentials and credential variables in the Bot editor</a>.</li> <li>Click</li> <li>Left click: use this action if the Click action does not work during Runtime.</li> <li>Right click</li> <li>Double click</li> </ul>
ComboBox (appears as a drop-down list)	<ul style="list-style-type: none"> <li>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.</li> <li>Get total items: retrieves the number of items in the box.</li> <li>Get selected index: retrieves the item's position in the menu. Note: Item index counts start at 1.</li> <li>Get selected text: retrieves the data from the selected item.</li> <li>Select item by index: selects the item that is located at the specified index.</li> </ul>

Object	Actions
	<p>Note: Item index counts start at 1.</p> <ul style="list-style-type: none"> <li>• Select item by text selects the item that matches the specified text. Note: The Assign value field is case-sensitive.</li> <li>• Expand</li> <li>• Click</li> <li>• Left click: use this action if the Click action does not work during Runtime.</li> <li>• Right click</li> <li>• Double click</li> </ul>
Link	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Click</li> <li>• Left click: use this action if the Click action does not work during Runtime.</li> <li>• Right click</li> <li>• Double click</li> </ul>
ListView	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get total items: retrieves the number of items in the list.</li> <li>• Get selected index: retrieves the item's position in the menu. Note: Item index counts start at 1.</li> <li>• Get selected text: retrieves the data from the selected item.</li> <li>• Select item by index: selects the item that is located at the specified index. Note: Item index counts start at 1.</li> <li>• Select item by text selects the item that matches the specified text. Note: The Assign value field is case-sensitive.</li> <li>• Click</li> <li>• Left click: use this action if the Click action does not work during Runtime.</li> <li>• Right click</li> <li>• Double click</li> </ul>
Menu	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get total items: retrieves the number of items in the menu.</li> <li>• Get selected index: retrieves the item's position in the menu. Note: Item index counts start at 1.</li> <li>• Get selected text: retrieves the data from the selected item.</li> <li>• Select item by index: selects the item that is located at the specified index. Note: Item index counts start at 1.</li> </ul>

Object	Actions
	<ul style="list-style-type: none"> <li>• Select item by text selects the item that matches the specified text. Note: The Assign value field is case-sensitive.</li> <li>• Left click: use this action if the Click action does not work during Runtime.</li> <li>• Right click</li> </ul>
Page Tab	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get total items: retrieves the number of items in the tab.</li> <li>• Get selected index: retrieves the item's position in the menu. Note: Item index counts start at 1.</li> <li>• Get selected text: retrieves the data from the selected item.</li> <li>• Select item by index: selects the item that is located at the specified index. Note: Item index counts start at 1.</li> <li>• Select item by text selects the item that matches the specified text. Note: The Assign value field is case-sensitive.</li> <li>• Left click: use this action if the Click action does not work during Runtime.</li> <li>• Right click</li> <li>• Double click</li> </ul>
RadioButton	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get status: retrieves whether the radio button is selected. Returns selected or deselected.</li> <li>• Select</li> <li>• Left click: use this action if the Select action does not work during Runtime.</li> <li>• Right click</li> <li>• Double click</li> </ul>
Table	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get table: retrieves the table data and saves it to a Table variable. For more information, see <a href="#">Example of extracting data from a web table</a>.</li> <li>• 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 0. For example, to retrieve the data in cell A2, enter            0            in the Row field and            1            in the Column field.</li> </ul>

Object	Actions
	<ul style="list-style-type: none"> <li>Get cell index by text: retrieves the index of the cell containing the specified text. Note: The Cell Text field is case-sensitive.</li> <li>Get total rows: retrieves the number of rows that contain values.</li> <li>Get total columns: retrieves the number of columns that contain values.</li> <li>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.</li> <li>Set cell by text: enters text into the cell containing the specified text. Note: The Find Text field is case-sensitive.</li> <li>Left click: use this action if the Click action does not work during Runtime.</li> <li>Right click</li> <li>Double click</li> </ul>
TextBox	<ul style="list-style-type: none"> <li>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.</li> <li>Set text: enters text into the UI object. It supports <a href="#">Credentials and credential variables in the Bot editor</a>.</li> <li>Append text: adds text to the end of existing text in the field, instead of overwriting it.</li> <li>Click</li> <li>Left click: use this action if the Click action does not work during Runtime.</li> <li>Right click</li> <li>Double click</li> </ul>
Tree (Role is 10 but control is displayed as ListView)	<ul style="list-style-type: none"> <li>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.</li> <li>Get total items: retrieves the number of items in the tree.</li> <li>Get selected index: retrieves the item's position in the menu. Note: Item index counts start at 1.</li> <li>Get selected text: retrieves the data from the selected item.</li> <li>Select item by index: selects the item that is located at the specified index. Note: Item index counts start at 1.</li> <li>Select item by text selects the item that matches the specified text. Note: The Assign value field is case-sensitive.</li> <li>Left click: use this action if the Click action does not work during Runtime.</li> </ul>

Object	Actions
	<ul style="list-style-type: none"> <li>• Right click</li> <li>• Double click</li> </ul>

## 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.

### Prerequisites

- 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%.

Considerations when recording a task:

- If you are automating a task using a browser, do not use autofill to enter values into fields.
- Use mouse clicks, keystrokes, and shortcuts when possible.
- 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 recorder action waits until the browser is completely rendered and is in a ready state before executing the action.

### Procedure

To record a single interaction with an object control, follow these steps:

1. Double-click or drag Recorder > Capture.
2. In the Select window field, specify the application or browser window in which to capture an object.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

Note: Do not use the variable option to select a window, until after you have captured the object.

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

Note: During runtime, verify that the TaskBot identifies the correct window.

4. Click Capture object.  
The selected window appears.
5. 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 [Supported browsers for Enterprise A2019](#).
6. 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.  
Note: When it is not possible to capture a UI element with the Recorder, use the [Image Recognition package](#). For example, when the Recorder cannot capture a Submit button as a BUTTON control type.
7. Review the Object properties list.  
The bot will use the selected properties to identify the object control during runtime.  
Ensure that only the properties that do not change are selected.
8. Select the Action from the drop-down list.

If the selected Action supports background process, a Run in the background check box is available to enable this process. [Background processing](#)

To see table of all object controls and possible actions, see [Objects and actions](#).

9. Enter a wait time for the object control to appear.
10. Optional: Assign the output to a variable.
11. Click Apply.  
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:

Using 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.
- 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.

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 `$prompt-assignment$` and click Apply.
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 and click Apply.
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.

Action	Description
	<p>Limitations and characteristics of the GET method include the following:</p> <ul style="list-style-type: none"> <li>• URI length is limited to 2048 characters.</li> <li>• All parameters are passed in the URI.</li> <li>• The GET method exposes data that is in the URI, making it less secure than the POST method.</li> <li>• GET does not change any data, making it safe for all users regardless of authorization.</li> </ul>
Patch method	Modifies the resource that is identified by the URI.
Post method	<p>Creates a new resource in the URI.</p> <ul style="list-style-type: none"> <li>• Parameters are passed in request body.</li> <li>• There is no limit on length for a request body.</li> </ul>
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](#).

- [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".

Related tasks

[Example of building a bot that uses credential variables](#)

Related reference

[Credentials and credential variables in the Bot editor](#)

## 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.

### Procedure

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.
    - a) In the Name column, enter `api_key`.
    - b) In the Value column, enter `special-key`.
  - d) Create the variable `dOutput` in the Assign the output to a variable field.
  - e) Click Apply.
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 `$Output{Body}$`.
  - d) Click Apply.
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.
  - a) In the Name column, enter `api_key`.
  - b) 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.
- g) Click Apply.

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}}\$.
  - d) Click Apply.

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.
  - a) In the Name column, enter api\_key.
  - b) 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 \${Output} in the Assign the output to a variable field.
- g) Click Apply.

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}}\$.
- d) Click Apply.

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. <ul style="list-style-type: none"> <li>• In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>• In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>• In the Action option, select Check, Uncheck, or Toggle.</li> </ul>

Action	Description
Click	<p>Performs a click operation.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> </ul>
Click menu	<p>Clicks a menu item by text or index.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Select option, select Name or Index to specify the name or index of the menu item.</li> </ul>
Connect	See <a href="#">Using Connect action for SAP</a> .
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	<p>Performs a double-click operation.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> </ul>
Expand	<p>Expands the item by text or index.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Select option, select Text or Index to specify the text or index of the item.</li> </ul>
Export table	See <a href="#">Using Export table action</a> .
Get cell count	<p>Gets number of cells in a table or grid.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get children name	Gets children control names.

Action	Description
	<ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to list variable field, specify the list variable.</li> </ul>
Get children text	<p>Gets the text associated with children control.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to list variable field, specify the list variable.</li> </ul>
Get column count	<p>Gets number of columns in a table or grid.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get row count	<p>Gets number of rows in a table or grid.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get selected item	<p>Gets selected item index from a combo box, page tab, or a tree view control.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get status	<p>Gets status of a radio button or check box.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get table cell index	Gets table cell index for text.

Action	Description
	<ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Search text field, specify the text.</li> <li>Select the Case sensitive search option to specify a case-sensitive search.</li> <li>Select the All occurrences check box.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get table cell text	<p>Gets table cell text by index.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Row field, specify the number of row from which you want to get the text.</li> <li>In the Column field, specify the number of column from which you want to get the text.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get text	<p>Gets text from a text box, label, or status bar.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Get total item	<p>Gets total item from a combo box, page tab, or tree view control.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Assign the output to a variable field, specify the variable.</li> </ul>
Left click	<p>Performs a left-click operation.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> </ul>
Right click	<p>Performs a right-click operation.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> </ul>
Select item	<p>Selects an item by text or index.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Select option, select Text or Index to specify the text or index of the item.</li> </ul>
Select radio option	<p>Selects a radio button.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> </ul>
Send virtual key	<p>Sends a virtual key.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Select list, select a key.</li> </ul> <p>See <a href="#">Virtual keys in SAP GUI</a>.</p>
Set table cell text	See <a href="#">Set table cell text</a> .
Set text	<p>Sets the text in an editable field.</p> <ul style="list-style-type: none"> <li>In the Session name field, enter the session name you used to connect to the SAP application in the Connect action.</li> <li>In the Field path field, specify the location or a string variable that contains the location of the object.</li> <li>In the Field value field, specify the text.</li> <li>Select the Append text check box.</li> </ul>

## 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.

## Procedure

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:
    - c) Name: Specify the name of the SAP server that appears on the SAP Logon screen.
    - d) Client: Specify a value for the client identifier. You can enter a value of 0 through 999.
    - e) 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.
    - f) 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.
    - g) Language: Specify the two-letter code for the language set on the SAP server.
4. Click Apply.

### Related tasks

[Using Export table action](#)

[Using Set table cell text action](#)

### Related reference

[SAP package](#)

## Using Export table action

Use the Export table action to export a table to a datatable or CSV file.

## Procedure

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 Database to specify the export option of the table cell:

Choice	Steps
CSV	<ul style="list-style-type: none"> <li>a) In the File Path field, specify the location or file variable.</li> <li>b) Optional: In the Encoding field, specify the value.</li> <li>c) Select the Export data with header check box to export with header.</li> <li>d) In the When saving field, select Append to existing log file or Overwrite</li> </ul>

Choice	Steps
	existing log file to append the log file or overwrite the content within the log file.
Database	In the Database field, specify the value.

5. Click Apply.
6. 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.

### Procedure

To set a value in a table cell, follow these steps:

1. In the Actions palette, double-click or drag the Set table cell text 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 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.
5. In the Set Text field, enter the text to set the table cell.
  6. Click Apply.
  7. 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

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Combo box	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	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

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
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
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

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
List	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	--	--	--	--
	Get total items		Yes	Yes	--	Yes
	Select item by index		Yes	Yes	--	Yes
	Select item by text		No	No	--	No
Tree		Expand node	--	--	--	--
		Select node by text	--	--	--	--
	Get property	Get property	Yes	Yes	--	Yes
		Set focus	--	--	--	--
	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	--	--	--	--
		Scroll to left	--	--	--	--
	Get property	Get property	No	No	--	No
		Set focus	--	--	--	--
	Left click	Left click	No	No	--	No
	Right-click	Right-click	No	No	--	No

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Shell	Double-click	Double-click	No	No	--	No
	Get total items		No	No	--	No
	Get selected index		No	No	--	No
	Get selected text		No	No	--	No
	Select item by index		No	No	--	No
	Select item by text		No	No	--	No
Grid view	Get property	Get property	--	--	--	--
		Set focus	--	--	--	--
	Left click	Left click	--	--	--	--
	Right-click	Right-click	--	--	--	--
	Double-click	Double-click	--	--	--	--
List view		Select all	--	--	--	--
	Select cell by index	Select cell by index	Yes	Yes	--	Yes
	Select cell by text		Yes	Yes	--	Yes
		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

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Main window		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
		Send key	--	--	--	--
		Close window	--	--	--	--
		Maximize window	--	--	--	--
		Activate window	--	--	--	--
Toolbar		Restore window	--	--	--	--
		Execute scripts	--	--	--	--
		Get focus control ID	--	--	--	--
	Get property	Get property	--	--	--	--
		Set focus	--	--	--	--
	Left click	Left click	--	--	--	--
	Right-click	Right-click	--	--	--	--
	Double-click	Double-click	--	--	--	--
		Press button	--	--	--	--
		Select context-menu item by text	--	--	--	--
Label	Get property	Get property	Yes	Yes	--	Yes
		Set focus	--	--	--	--

Control name	Enterprise A2019 supported action	11.x supported action	SAP Logon 730	SAP Logon 740	SAP Logon 750	SAP Logon 760 (Patch 5)
Rest of the control	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	Get property	Get property	--	--	--	--
		Set focus	--	--	--	--
	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	<p>Captures specified area of an open application.</p> <p>See <a href="#">Using Capture area action</a></p>
Capture desktop	<p>Captures an image of the full desktop.</p> <ul style="list-style-type: none"> <li>In the File path to save image field, specify the path where you want to save the captured image.</li> </ul> <p>The following file extensions are supported: png, bmp, jpeg, tiff, gif, and wmf.</p> <ul style="list-style-type: none"> <li>Select Overwrite file check box to overwrite an existing file with the same name.</li> </ul>
Capture window	Captures screenshots of an open application window.

Action	Description
	See <a href="#">Using Capture window action</a>

## 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 click Apply and navigate away from the action editor window.

A user with admin privileges must enable this setting. See [Settings](#).

## Using Capture area action

Use the Capture area action in the Screen package to capture a screenshot of the application window area.

### Procedure

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. In the Select window field, specify the application or browser window in which to capture an object.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

Note: Do not use the variable option to select a window, until after you have captured the object.

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

Note: During runtime, verify that the TaskBot identifies the correct window.

4. 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.
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 Apply.

# Using Capture window action

Use the Capture window action of the Screen package to capture an open application window.

## Procedure

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. In the Select window field, specify the application or browser window in which to capture an object.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

Note: Do not use the variable option to select a window, until after you have captured the object.

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`

Note: During runtime, verify that the TaskBot identifies the correct window.

4. Browse to select the File path to save image.

The following file extensions are supported: png, bmp, jpeg, tiff, gif, and wmf.

5. Click Overwrite file to replace an existing file with the same name.

6. Click Apply, and then 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	<p>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.</p> <p>Example: The Windows Audio service status might be running. You can assign the status value to a selected variable.</p>

Action	Description
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 <a href="#">Using Keystrokes action</a> .

Watch the following video on how to use Simulate keystrokes:

### Using Simulate keystrokes

- [Using Keystrokes action](#)  
Use the Keystrokes action to simulate keystrokes.

### Related tasks

[Build a basic bot that uses a desktop application](#)

## Using Keystrokes action

Use the Keystrokes action to simulate keystrokes.

### Procedure

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. In the Select window field, specify the application or browser window in which to capture an object.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

Note: Do not use the variable option to select a window, until after you have captured the object.

3. 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.

4. Optional: In the Delay between each keystroke in ms field, the delay time.

Note: The default is set to 10 milliseconds.

5. Click Apply.

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 <a href="#">Using Get action</a>
Get next	See <a href="#">Using Get next action</a>
Send trap	See <a href="#">Using Send trap action</a>
Set	See <a href="#">Using Set action</a>
Walk	See <a href="#">Using Set action</a>

- [Using Get action](#)

Use the Get action in the SNMP package to retrieve data of an object that is managed by an SNMP agent.

- [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.

- [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.

- [Using Set action](#)

Use the Set action in the SNMP package to set a value for an object managed by the SNMP agent.

- [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.

Related reference

[Active Directory package](#)

[Printer package](#)

## Using Get action

Use the Get action in the SNMP package to retrieve data of an object that is managed by an SNMP agent.

### Procedure

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.
V3	<p>Specify the community string you want to use in the Community field.</p> <p>Select an option from the Authentication level list to specify the authentication level you want to use.</p> <ul style="list-style-type: none"> <li>• None: No authentication will be used.</li> <li>• Authentication Only: Enables you to use authentication only. <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> </ul> </li> <li>• Authentication and privacy: Enables you to use authentication and privacy. <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to</li> </ul> </li> </ul>

Option	Action
	<p>specify the authentication method you want to use.</p> <p>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.</p> <p>c) Select DES or AES from the Privacy method list to specify the privacy method you want to use.</p> <p>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.</p>

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 Apply.
10. 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.

### Procedure

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.

Option	Action
V2C	Specify the community string you want to use in the Community field.
V3	<p>Specify the community string you want to use in the Community field.</p> <p>Select an option from the Authentication level list to specify the authentication level you want to use.</p> <ul style="list-style-type: none"> <li>• None: No authentication will be used.</li> <li>• Authentication Only: Enables you to use authentication only.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> </ul> </li> <li>• Authentication and privacy: Enables you to use authentication and privacy.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> <li>c) Select DES or AES from the Privacy method list to specify the privacy method you want to use.</li> <li>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.</li> </ul> </li> </ul>

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 Apply.
  10. 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.

### Procedure

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.
V3	<p>Specify the community string you want to use in the Community field.</p> <p>Select an option from the Authentication level list to specify the authentication level you want to use.</p> <ul style="list-style-type: none"> <li>• None: No authentication will be used.</li> <li>• Authentication Only: Enables you to use authentication only.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> </ul> </li> <li>• Authentication and privacy: Enables you to use authentication and privacy.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> </ul> </li> </ul>

Option	Action
	<p>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.</p> <p>c) Select DES or AES from the Privacy method list to specify the privacy method you want to use.</p> <p>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.</p>

4. In the Object ID field, specify the ID of the object for which you want to retrieve details.
5. Optional: In the Authoritative 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 Authoritative 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 Apply.
10. 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.

## Procedure

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.
V3	<p>Specify the community string you want to use in the Community field.</p> <p>Select an option from the Authentication level list to specify the authentication level you want to use.</p> <ul style="list-style-type: none"> <li>• None: No authentication will be used.</li> <li>• Authentication Only: Enables you to use authentication only.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> </ul> </li> <li>• Authentication and privacy: Enables you to use authentication and privacy.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> <li>c) Select DES or AES from the Privacy method list to specify the privacy method you want to use.</li> <li>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.</li> </ul> </li> </ul>

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 Apply.
10. 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.

### Procedure

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.
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. <ul style="list-style-type: none"> <li>• None: No authentication will be used.</li> <li>• Authentication Only: Enables you to use authentication only.</li> </ul>

Option	Action
	<p>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</p> <p>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.</p> <ul style="list-style-type: none"> <li>• Authentication and privacy: Enables you to use authentication and privacy.           <ul style="list-style-type: none"> <li>a) Select MD5 or SHA from the Authentication method list to specify the authentication method you want to use.</li> <li>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.</li> <li>c) Select DES or AES from the Privacy method list to specify the privacy method you want to use.</li> <li>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.</li> </ul> </li> </ul>

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 Apply.
11. 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](#).

Note: For an example task about using the SOAP Web Service action, see [Example of using the SOAP web service action](#).

Related tasks

[Example of building a bot that uses credential variables](#)

Related reference

[Credentials and credential variables in the Bot editor](#)

## 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	<p>Runs a sequence of actions.</p> <ul style="list-style-type: none"> <li>• Creates a container for actions without impacting the bot run.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>Configures actions within the Step action.</li> <li>Runs the arranged actions in a sequential order.</li> <li>Groups various actions for better management.</li> <li>Optional: In the Title field, specify the title.</li> </ul>

Watch the following video on how to use the Step actions:

Using 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	<p>Assigns or concatenates strings.</p> <ul style="list-style-type: none"> <li>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.</li> <li>In the Select the destination string variable field, specify the variable.</li> </ul>
Compare	<p>Compares two strings.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Compare to string field, specify the source string.</li> <li>In the When comparing field, select an option:           <ul style="list-style-type: none"> <li>Match case: Matches capitalization.</li> <li>Do not match case: Does not match capitalization.</li> </ul> </li> <li>In the Assign the output to variable list, specify the Boolean variable.</li> </ul>
Extract text	See <a href="#">Using the Extract text action</a> .
Find	See <a href="#">Using Find action</a> .
Generate random string	<p>Generates a string of uppercase and lowercase alphanumeric characters and assigns it to a string variable.</p> <ul style="list-style-type: none"> <li>In the String length field, enter the number of characters in the generated string. Note: The maximum number of characters is 300.</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>In the Enter the destination variable field, specify the string variable.</li> </ul>
Length	<p>Retrieves the string length.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the number variable.</li> </ul>
Lowercase	<p>Converts the source string to lowercase.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the variable.</li> </ul>
Replace	See <a href="#">Using Replace action</a> .
Reverse	<p>Reverses the source string.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the variable.</li> </ul>
Split	See <a href="#">Using Split action</a> .
Substring	<p>Extracts a substring from a string.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Start from field, specify the starting point.</li> <li>Optional: In the Length field, specify the length.</li> <li>In the Assign the output to variable list, specify the variable.</li> </ul>
To boolean	<p>Converts a string to a Boolean.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the Boolean variable.</li> </ul>
To number	<p>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.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the number variable.</li> </ul>
Trim	<p>Trims blanks and whitespaces from a string.</p> <ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In Trim from the beginning and Trim from the end, select options.</li> <li>In the Assign the output to variable list, specify the variable.</li> </ul>
Uppercase	Converts the source string to uppercase.

Action	Description
	<ul style="list-style-type: none"> <li>In the Source string field, specify the source string.</li> <li>In the Assign the output to variable list, specify the variable.</li> </ul>

Watch the following video on how to use the String actions:

Using String actions

Related tasks

[Using the Extract text action](#)

[Using Find action](#)

[Using Replace action](#)

[Using Split action](#)

## 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:

### Procedure

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	<p>Extracts the entire text followed by the value that you have provided in the Start after text field.</p> <p>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.</p> <p>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 <code>1</code> 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.</p>
Before and/or after	<p>Extracts the text between the values provided in the Start after text and the End before text fields.</p> <p>a) In the Start after text field, enter a string to use as the starting point.  b) In the OR or AND field, select one of the options: <ul style="list-style-type: none"> <li>• c) 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.</li> <li>• d) 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.</li> </ul> e) In the End before text field, specify a string to use as the endpoint for extracting the text.  f) 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.</p>

Option	Steps
	For example, if the source string is <code>This is a test string</code> which is used to extract specific substring 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	<p>Extracts the entire text preceding the value you have provided in the End before text field.</p> <ul style="list-style-type: none"> <li>a) In the End before text field, specify a string to use as the endpoint for extracting the text.</li> <li>b) 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.</li> </ul> <p>For example, if the source string is <code>This is a test string</code> which is used to extract specific substring 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.</p>

4. 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.
5. 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 Apply.
10. 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.

## Procedure

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 Apply.
9. 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.

## Procedure

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 Apply.  
11. 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.

### Procedure

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 Apply.
  8. 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 <a href="#">Environment variables for System package</a>
Lock computer	Locks the computer.
Logoff	Logs the user off the computer.
Restart	Restarts the computer.
Shutdown	Shuts down the computer.

- [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.

Related tasks

[Using Log To File action](#)

Related reference

[Application package](#)

## 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. Note: Use ProgramData for devices that run Windows Vista and later OS.	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>\App
COMPUTERNAME	Returns the device name without the domain.	AA-NY-FRANKSINA
CommonProgramFiles	Returns the file path to the Common Files directory.	C:\Program Files\Co

Variable	Description	Example value
CommonProgramFiles(x86)	Returns the file path to the Common Files directory. Note: This is only available for devices that run 64-bit version.	C:\Program Files (x86)
CommonProgramW6432	Returns the file path to the Common Files directory. Note: <ul style="list-style-type: none"><li>• This is only available for devices that run 64-bit version.</li><li>• Only use CommonProgramW6432 for devices that run Windows Vista and later OS</li></ul>	C:\Program Files\Com
ComSpec	Returns the file path to the command processor	C:\Windows\system
DriverData	Returns the file path to the Driver Data directory.	C:\Windows\System
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>\Ap
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>\On
OS	Returns the device operating system name.	Windows_NT
Path	Returns a semicolon-delimited list of directories that contain executable programs.	C:\Windows\system \System32\Wbem;C:\System32\Window
PATHEXT	Returns a semicolon-delimited list of file extensions that the system can execute.	.COM;.EXE;.BAT;.CM
PROCESSOR_ARCHITECTURE	Returns the process architecture of the device.	AMD64
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%\Wi \Windows\system32
PUBLIC	Returns the Public folder path.	C:\Users\Public
SystemDrive	Returns the device system drive.	C:

Variable	Description	Example value
SystemRoot	Returns the system root folder.	C:\Windows
TMP	Returns the path to the directory that stores temporary files.	C:\Users\<user>\Ap
TEMP	Returns the path to the directory that stores temporary files.	C:\Users\<user>\Ap
USERDNSDOMAIN	Returns the DNS domain of the user.	AAI.AASPL-BRD.CO
USERDOMAIN	Returns the domain of the user.	AAI.AASPL-BRD.CO
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 bots of shorter automation sequences 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.

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](#)
- Other users can reuse child bots without viewing their contents.

The Task Bot package includes the following actions:

Action	Description
Pause	<p>Temporarily pauses the running bot. Use the Pause action to modify data or to verify the status of a relevant component.</p> <p>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.</p>
Run	<p>Runs the selected child bot with the specified input values and saves the output values to a dictionary variable. Each key in the dictionary is the variable name and corresponding value from the child bot.</p> <p>You can click the Current Task Bot tab to run the current bot, the Control Room file tab to run a bot that is available in the Enterprise Control Room, or the Variable tab to use a variable to specify the bot to run. 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.</p> <p>Note:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> <p>For an example, see <a href="#">Example of using the Run action</a>.</p>
Stop	<p>Stops the running bot.</p> <p>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.</p>

## 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](#).

**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 <a href="#">Using the Connect action</a> .
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	<p>Retrieves the values of all fields and assigns them to a table variable.</p> <ul style="list-style-type: none"> <li>Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.</li> <li>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:           <ul style="list-style-type: none"> <li>Field index</li> <li>Field name</li> <li>Field value</li> <li>Is Editable (yes/no)</li> <li>Is Hidden (yes/no)</li> </ul> </li> </ul> <p>Note: You can use this action with the TN3270E and TN5250E terminal types.</p>
Get field	Retrieves the value of a field based on the index or name of the field and assigns it to a string variable.

Action	Description
	<ul style="list-style-type: none"> <li>Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.</li> <li>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.</li> <li>Select a string variable to store the retrieved data from the Assign the value to an existing variable list.</li> </ul> <p>Note: You can use this action with the TN3270E and TN5250E terminal types.</p>
Get text	See <a href="#">Using Get text action</a> .
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.
Send key	See <a href="#">Using Send key action</a> .
Send text	See <a href="#">Using Send text action</a> .
Set cursor position	<p>Sets the position of the cursor on the screen of the terminal.</p> <ul style="list-style-type: none"> <li>Specify the Terminal emulator session name that you used to establish a connection with the terminal using the Connect action.</li> <li>Specify the row number in which to set the cursor in the Set row field.</li> <li>Specify the column number in which to set the cursor in the Set column field.</li> </ul> <p>Note: You can enter a value of 1 through 999 to specify the row and column number where the cursor is set.</p>
Set field	See <a href="#">Using Set field action</a> .
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 <a href="#">Using Wait action</a> .

## 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, 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, do the following:

## Procedure

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	<p>Select an option from the Connection type list to specify the type of connection you want to establish:</p> <ul style="list-style-type: none"> <li>• Telnet</li> <li>• SSH2</li> </ul> <p>For SSH2 connection type:</p> <ul style="list-style-type: none"> <li>• For User authentication:           <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> </li> <li>• For Key file authentication: Click one of the following options to specify the location of the file:           <ul style="list-style-type: none"> <li>• Control Room file: Enables you to select a PDF file that is available in a folder.</li> <li>• Desktop profile: Enables you to select a PDF file that is available on your device.</li> <li>• Variable: Enables you to specify the file variable that contains the location of the PDF file.</li> </ul> </li> <li>• 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.</li> </ul>
TN3270E	<p>a) Select an option from the Host name security list to specify the security you want to use:</p> <ul style="list-style-type: none"> <li>• b) NONE</li> <li>• c) SSL</li> <li>• d) TLS</li> </ul> <p>e) Select the Enable TN3270E support check box if you want to choose a connection method.</p> <p>Select an option from the Connection method list:</p> <ul style="list-style-type: none"> <li>• f) GENERIC: Enables you to specify the Device name.</li> </ul>

Option	Steps
	<ul style="list-style-type: none"> <li>• g) SPECIFIC: Enables you to specify the Device name and Resource (LU) Name.</li> <li>h) Select an option from the Terminal model list to specify the terminal workstation you want to connect to.</li> <li>i) Select an option from the Code page list to specify the encoding you want to use for the terminal.</li> </ul>
TN5250E	<p>a) Select an option from the Host name security list to specify the security you want to use:</p> <ul style="list-style-type: none"> <li>• b) NONE</li> <li>• c) SSL</li> <li>• d) TLS</li> </ul> <p>e) Select the Enable TN5250E support check box if you want to specify details about the device and resource.</p> <p>Enter a value in the Device name and Resource (LU) Name fields.</p> <p>f) Select an option from the Terminal model list to specify the terminal workstation you want to connect to.</p> <p>g) Select an option from the Code page list to specify the encoding you want to use for the terminal.</p>
VT100	<p>Select an option from the Connection type list to specify the type of connection you want to establish:</p> <ul style="list-style-type: none"> <li>• Telnet</li> <li>• SSH2</li> </ul> <p>For SSH2 connection type:</p> <ul style="list-style-type: none"> <li>• For User authentication: <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul> </li> <li>• For Key file authentication: Click one of the following options to specify the location of the file: <ul style="list-style-type: none"> <li>• Control Room file: Enables you to select a PDF file that is available in a folder.</li> <li>• Desktop profile: Enables you to select a PDF file that is available on your device.</li> <li>• Variable: Enables you to specify the file variable that contains the location of the PDF file.</li> </ul> </li> <li>• 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.</li> </ul>

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:

### Procedure

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:

### Procedure

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:

### Procedure

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:

### Procedure

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:

## Procedure

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.

## 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. <a href="#">Using interactive forms</a>	<ul style="list-style-type: none"> <li>On click: Button is clicked.</li> <li>Got focus: Input field is clicked.</li> <li>Lost focus: User leaves the input field.</li> <li>Value changed: Check box or radio button status is changed.</li> </ul>
Hot key	Runs the actions when specific keys are pressed.	<ul style="list-style-type: none"> <li>Modifiers: Ctrl, Shift, Alt, AltGr, and Win</li> <li>Keys: <ul style="list-style-type: none"> <li>Letters A-Z</li> <li>Numbers 0-9</li> </ul> </li> </ul>
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 <a href="#">Using Run action</a> .

## Using Run action

Use the Run action to run a 11.x bot from Enterprise A2019 in the 11.x Enterprise Control Room.

### Prerequisites

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](#)

### Procedure

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.

Field	Description
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.

8. 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.
9. 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.

## 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	<p>Closes the session.</p> <p>Specify the same session name from the Open action.</p>
Run function	<p>Runs a function within the VBScript.</p> <ul style="list-style-type: none"> <li>• In the VBScript session field, specify a session name. Use the same session name from the Open action.</li> <li>• Optional: Specify the function name to run and the arguments to pass to the function.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• Optional: If the specified function returns a value, specify the variable to store that value in the Assign the output to variable field.</li> </ul> <p>Note: In VBScript, stand alone scripts do not return a value.</p>
Open	<p>Opens a VBScript file.</p> <ul style="list-style-type: none"> <li>• In the VBScript session field, specify a session name. Use this same session name for other VBScript actions.</li> <li>• In the VBScript, choose one of the following options:           <ul style="list-style-type: none"> <li>• In the Import existing file option, select an existing VBScript file.</li> </ul> <p>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.</p> <ul style="list-style-type: none"> <li>• In the Manual input option, enter the VBScript.</li> </ul> </li> </ul>

## 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	<p>Makes the bot wait until a specific condition is true before executing the next action.</p> <p>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.</p> <p>This action offers the same conditions as the If package. See the <a href="#">If package</a>.</p>
Wait for screen change	See <a href="#">Using Wait for screen change action</a> .
Wait for window	See <a href="#">Using Wait for window action</a> .

## 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.

### Procedure

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
Window	<p>From the drop-down list, select the window title from the open applications.</p> <ul style="list-style-type: none"> <li>• 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</li> </ul>

Option	Steps
	<p>action to identify an application window with a similar title.</p> <p>Example: Enter Balance Sheet* to identify all open windows having title starting with Balance Sheet in the window title.</p> <ul style="list-style-type: none"> <li>The Executable field displays the complete path of the executable file to identify the right window.</li> </ul>
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 Apply, and then 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.

### Procedure

- In the Actions palette, double-click or drag the Wait for window action from the Wait package.
- 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
- Select an application window:

Option	Steps
Window	<p>From the drop-down list, select the window title from the open applications.</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>Example: Enter Balance Sheet* to identify all open windows with a title that starts with Balance Sheet.</p> <ul style="list-style-type: none"> <li>The Executable field displays the complete path of the executable file to identify the right window.</li> </ul>
Variable	Use a window variable to specify the application window you want to use.

- 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.
- 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.
- Click Apply, and then 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	<p>Activates a window.</p> <ul style="list-style-type: none"> <li>In the Window field, select an option:</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> <li>• In the Window title field, specify the title.</li> </ul>
Assign	<p>Assigns a source window variable's value to a designated window.</p> <ul style="list-style-type: none"> <li>• In the Select the source Window variable/value field, select an option:           <ul style="list-style-type: none"> <li>• Window: Inserts a source window variable value.</li> <li>• Variable: Inserts a user-defined variable value.</li> </ul> </li> <li>• In the Window title field, specify the title.</li> <li>• In the Select the destination window variable/value field, specify the variable.</li> </ul>
Close	<p>Closes the application window.</p> <ul style="list-style-type: none"> <li>• In the Window field, select an option:           <ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> </ul> </li> </ul> <p>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.</p>
Get active window title	<p>Retrieves the title of the active window. In the Assign the window title to variable field, specify the variable.</p>
Maximize	<p>Maximizes a window.</p> <ul style="list-style-type: none"> <li>• In the Window field, select an option:           <ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> </ul> </li> </ul>
Minimize	<p>Minimizes a window.</p> <ul style="list-style-type: none"> <li>• In the Window field, select an option:</li> </ul>

Action	Description
	<ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> </ul>
Resize	<p>Resizes a window.</p> <ul style="list-style-type: none"> <li>• In the Window field, select an option:           <ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> </ul> </li> <li>• In the Left, Top, Width, and Height fields, specify values for resizing the window.</li> </ul>
Set title	<p>Assigns a new window title to a window variable.</p> <ul style="list-style-type: none"> <li>• In the Window field, select an option:           <ul style="list-style-type: none"> <li>• Window: Inserts a window from a currently or previously open window. Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.</li> <li>• Variable: Inserts an existing window variable.</li> </ul> </li> <li>• In the New window title field, enter the new title.</li> </ul>

## 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 works 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.

- [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.

Related concepts

[Workload management](#)

Related tasks

[Attach work item template to TaskBot](#)

[Use Work Item variables](#)

## 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.

### Prerequisites

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.

### Procedure

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 Apply.

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](#)

Related tasks

[Attach work item template to TaskBot](#)

[Use Work Item variables](#)

[Insert Work Items](#)

## 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	<p>Deletes a specific node from XML file.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session action.</li> <li>Enter the XPath expression for the node to be deleted or select an existing window variable.</li> <li>Enter the attribute (optional)</li> </ul>
End session	<p>Closes an XML session.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session.</li> <li>Save and close the session.</li> </ul>
Execute XPath function	<p>Executes an XPath function and stores the results in a variable.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session action.</li> <li>Enter the XPath expression or select an existing window variable.</li> <li>Assign a String-type variable to the output.</li> </ul>
Get multiple nodes	<p>Retrieves the value of multiple nodes.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session action.</li> <li>Enter the XPath expression to retrieve multiple nodes or select an existing window variable.</li> <li>In the Get each node field, select if you require the Text value, XPath expression, or Specific attribute name of each node.</li> </ul>
Get single node	<p>Retrieves the value of a single node.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session action.</li> <li>Enter the XPath expression, and attribute (optional) to retrieve a node.</li> <li>Assign the output to a String-type variable.</li> </ul>
Insert node	See <a href="#">Using Insert node action</a> .
Save session data	<p>Saves the XML session data to a file or variable of type String.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session action.</li> <li>To save the session data to a file, select the Write XML data option and specify a file path.</li> <li>Select Overwrite to replace the existing file if a file with the same name exists in the location you have specified.</li> <li>Assign the output to a String-type variable.</li> </ul>

Action	Description
Start session	<p>Creates a new XML session based on an XML file or specified text.</p> <ul style="list-style-type: none"> <li>Start the XML session.</li> <li>Enter the session name or select an existing window variable. Use this session name for all corresponding actions.</li> <li>In the Data Source field, select either File or Text: <ul style="list-style-type: none"> <li>File: Select from the Control Room file, Desktop file, or an existing Variable of File type.</li> <li>Text: Specify the text name or select an existing window variable.</li> </ul> </li> <li>Save the XML session.</li> </ul>
Update node	<p>Updates the value of a node.</p> <ul style="list-style-type: none"> <li>Type the session name or select an existing window variable used in the Start XML session action.</li> <li>Enter the XPath expression for the node to be updated.</li> <li>Enter a New value for the node.</li> <li>Select the Updates attribute(s) option to create a new Dictionary or to add an existing Variable of Dictionary-type.</li> </ul>
Validate XML document	<p>The tags and document structure are defined when the XML document is created. Use this action to validate an XML document.</p> <ul style="list-style-type: none"> <li>Enter the session name or select an existing window variable used in the Start XML session.</li> <li>Select the validation type from the following options: <ul style="list-style-type: none"> <li>XML schema files (.xsd)</li> <li>Specify the schema using a List or Variable. Create a new variable of type List or use one that already exists.</li> <li>Internal Document Type Definitions (DTDs)</li> <li>Well formed</li> </ul> </li> <li>Assign the output to a variable using Assign the output (Valid or Invalid) to variable</li> </ul>

## 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.

### Procedure

To insert a node, do the following:

1. Enter the session name.  
Use the name of the session that you have used in the Start XML session action.

2. Specify an XPath expression to indicate where to insert the new node.
3. Enter a node name.
4. Enter a value for the node.
5. If the node name exists, select from the following options:
  - Insert it anyways
  - Skip it
  - Overwrite it
6. 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 note

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.
7. 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 Apply.

## Universal Recorder overview

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](#).

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](#).

For a common use case, see [Example of entering data into a web form from a worksheet](#).

The Universal Recorder is also used within actions to capture coordinates (Mouse > Click action) or a local file path (Application > Open program/file action).

Watch the following video on how to use the Universal Recorder:

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## Using the Universal Recorder

To learn more, search for the Automating Tasks Using Enterprise A2019 Universal Recorder course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

## Supported applications and browsers

The Universal Recorder supports the following:

### 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](#).

- 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
- Internet Explorer

### 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 [Objects and actions](#).

Watch the following video for a demo on using the Universal Recorder in various applications:

Get started with Universal Recorder

## 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](#)

[Editing a task recorded with the Universal Recorder](#)[Related reference](#)[Supported browsers for Enterprise A2019](#)[Secure recording mode](#)[Recording tasks in applications that run on JRE 6](#)[Recorder package](#)

## 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](#).

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](#).

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	<ul style="list-style-type: none"> <li>• Item name</li> <li>• Item value</li> <li>• Name</li> <li>• Parent</li> <li>• Value</li> </ul>
HTML	<ul style="list-style-type: none"> <li>• HTML InnerText</li> <li>• HTML name</li> <li>• HTML value</li> </ul>

## 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.

## 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.

## Prerequisites

- 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%.

Considerations when recording a task:

- If you are automating a task using a browser, do not use autofill to enter values into fields.
- Use mouse clicks, keystrokes, and shortcuts when possible.
- 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 recorder action waits until the browser is completely rendered and is in a ready state before executing the action.

## Procedure

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. Select your device.  
The Device button is a laptop icon.  
Automation Anywhere remembers this device until you log out. Each time you log in, reselect your device.
3. Click Record.  
The Record button is a video camera icon.  
The Record application window appears.
4. Select a window from the drop-down list.

Select the Currently active window, Desktop, or Taskbar, or a window from the list of Available windows.

- If you open an application when the recorder is running, click the Refresh icon.
5. Click Start recording.
- The Record Application window appears with Pause and Stop buttons. Pause and resume the recording as needed.
- The Recording actions window also appears. It shows the number of actions recorded.
6. Perform the actions to record.
- For example, click buttons, fill in forms, or search a website.
- While you are recording, the following will occur:
- A highlighted box will surround a control when you mouse over it.  
Note: If the box does not appear, verify that you have enabled the Automation Anywhere Google Chrome extension. For more information, see [Supported browsers for Enterprise A2019](#).
  - A Capture action will be generated for each operation.
  - Where applicable, the Recorder will generate [User-defined variables](#).
7. Click Stop to end the recording.
- The recorded steps appear as Recorder actions.
8. Click Save Changes.

## Next steps

[Edit the task](#).

### Editing 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.

## Prerequisites

Select the List view to see the full details of each action.

Use these steps to edit one action of the recorded task. To add a Capture action to the task, see [Using the Capture action](#).

## Procedure

To edit a recorded task, follow these steps:

1. Click the Capture action that corresponds with the step.  
The Capture edit window appears.
2. Make the following changes, as necessary:
  - Select a different window either from the drop-down list or by inserting a window type variable.
  - Change the window selection to the Currently active window option.
  - Insert a wildcard character (\*) in the window title that is subject to change, such as for online invoices. For example,

Sample\* -

Google Chrome

Note: During run time, verify that the TaskBot identifies the correct window.

- Click Re-capture object to select a new object control.
- Select a different Action from the drop-down list.

If the selected Action supports background process, a Run in the background check box is available to enable this process. [Background processing](#)

If the desired Action does not appear in the drop-down list, recapture the object. To see table of all object controls and possible actions, see [Objects and actions](#).

- Enter a new wait time for the object control to appear.
- Assign the output to a variable.

3. Click Apply.

4. Click Save.

## Next steps

[Run the bot](#).

## AI-Sense for recording tasks from remote applications

AI-Sense 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.

AI-Sense 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.

AI-Sense uses computer vision to intelligently create dynamic linking between objects by determining their composition to deliver change-resilient automation. AI-Sense enables you to accurately automate applications even when labels and text change their position.

Important:

- AI-Sense Recorder supports only the English language. For example, if the field text is in a non-English language, the AI-Sense Recorder does not capture the text.
- [Record a task with AI-Sense Recorder](#)  
Use the AI-Sense 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 AI-Sense](#)  
After you have recorded a task using the AI-Sense Recorder, you can edit the recorded actions to perform various actions on the captured objects.
- [Use variable anchor](#)  
The variable anchor in the AI-Sense Recorder enables you to perform an action on multiple objects of the same type.

Related tasks

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[Record a task with AISSense Recorder](#)  
[Edit a task recorded using AISSense](#)

## Record a task with AISSense Recorder

Use the AISSense Recorder to record an end-to-end task on a remote application or an application with a complex user interface (UI).

### Prerequisites

- 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.
- If you are using Enterprise A2019 On-Premises, ensure that the AISSense Recorder package is added to your Enterprise Control Room.

[Add AISSense Recorder package to Enterprise Control Room](#)

Note: AISSense Recorder does not require a separate license or purchase.

The recorder captures only 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.

Important: This version of AISSense Recorder supports a limited set of controls. Support for more controls is planned in upcoming Enterprise A2019 releases.

Keep the following considerations in mind when recording a task:

- Configure the device display settings to 100% DPI.
- 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.

### Procedure

1. Create a new bot or open an existing bot for which you want to record a task.
2. Click the AISSense Recorder icon next to the Universal Recorder.  
If you are using the AISSense Recorder for the first time, the system downloads the required dependent files on your device, which might take some time.
3. In the Automation Anywhere Recorder dialog box, select an option from the window or URL list to specify the application window you want to use for recording.  
If you opened an application recently and it is not available in the list, click the Refresh icon.
4. Click Start AISSense recording.  
The recorder toolbar appears with Pause, End recording, Cancel, and Analyze window options.

The system analyzes the application window you selected to identify the UI objects on 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 continue to record the task.

The system highlights the objects with low accuracy, which indicates that you have to manually specify a type for those objects from the Control Selection dialog box.

5. Perform the actions you want 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 object is highlighted with a box. If the object is not highlighted, click the Analyze window option on the recording toolbar. After the system finishes analyzing the application window, you can capture the required 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.

Note:

- If you want to capture an option from a list, click the list and wait till 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 till the option is highlighted.
- If you use scroll on an application window, you must click the Analyze window option to analyze the new objects on the window.

6. Click End recording after you finish capturing all the required objects.

The recorded steps appear as a separate action in the bot.

7. You can edit the recorded action or click Apply to save the changes.

8. Click Save to save the bot.

#### Detect objects manually

If the recorder is not able to identify the type of object you have selected, the Control Selection dialog box is displayed. Manually specify the type of the object selected and its associated text:

1. Drag the mouse pointer across the object you want to capture.

The Control Selection dialog box appears.

2. Select an option from the Type list to specify the type of the object you have selected.

For example, you can select options such as Image Button, Active Text, Textbox, Button, and Vertical Scrollbar.

3. Select an option from the Anchors list to select the associated text with the object you have selected.

4. Click OK.

Watch the following video on how to use the AI-Sense Recorder:

Video showing how to use the AI-Sense Recorder

- [Add AI-Sense Recorder package to Enterprise Control Room](#)

If you are using Enterprise A2019 On-Premises, download and add the AI-Sense Recorder package to your Enterprise Control Room to enable the recorder in the Bot editor.

Related tasks

[Edit a task recorded using AI-Sense](#)

Related reference

[AI-Sense for recording tasks from remote applications](#)

[Actions that can be performed on captured objects](#)

# Add AI-Sense Recorder package to Enterprise Control Room

If you are using Enterprise A2019 On-Premises, download and add the AI-Sense Recorder package to your Enterprise Control Room to enable the recorder in the Bot editor.

## Procedure

1. Download the latest version of AI-Sense Recorder package from the Automation Anywhere support site: [A-People Downloads page \(Login required\)](#).
2. Click the Automation Anywhere Enterprise A2019 setup file.
3. Click the AI-Sense jar file and then click Download on the toolbar.
4. Add the AI-Sense Recorder package to the Enterprise Control Room.  
[Add packages to the Enterprise Control Room](#)

## Edit a task recorded using AI-Sense

After you have recorded a task using the AI-Sense Recorder, you can edit the recorded actions to perform various actions on the captured objects.

Editing a recorded task enables you to perform these actions:

- Change the application window in which you want to perform the operation
- Change the properties of the captured objects
- Specify the action you want to perform on the captured objects
- Introduce a delay or specify a wait time 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 AI-Sense 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

## Procedure

1. Open the bot that contains the recorded actions you want to edit.
2. Click the action you want to edit.
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 an object, see [Actions that can be performed on captured objects](#).
6. Enter a value in the Wait for control field to specify the period of time the system must wait for the object control to appear on the application window.
7. Select a variable from the Assign the output to variable to assign the output to that variable.
8. Perform the Steps 2 through 7 for other actions that you want to edit in the bot.
9. Click Apply.

10. Click Save to save the bot.

- [Actions that can be performed on captured objects](#)

After you capture objects using the AI-Sense Recorder, you can perform various actions that a bot can perform on the object at runtime.

## Actions that can be performed on captured objects

After you capture objects using the AI-Sense 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	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Click: Use this action to select the captured object.</li> <li>• Left click: Use this action if the Click action does not work during runtime.</li> </ul>

Object	Actions
	<ul style="list-style-type: none"> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Image button	<ul style="list-style-type: none"> <li>Left click: Use this action if the Click action does not work during runtime.</li> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Active text	<ul style="list-style-type: none"> <li>Left click: Use this action if the Click action does not work during runtime.</li> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Passive text	<ul style="list-style-type: none"> <li>Get text: Retrieves text available in the area you have specified.</li> </ul>
Check box	<ul style="list-style-type: none"> <li>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.</li> <li>Get status: Retrieves whether the check box is selected. Returns checked or unchecked.</li> <li>Check: Selects the captured check box.</li> <li>Uncheck: Clears the captured check box.</li> <li>Toggle: Switches the check box to the opposite status. For example, if the check box is selected, use the Toggle action to clear it.</li> <li>Left click: Use this action if the Toggle action does not work during Runtime.</li> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Combo box (appears as a drop-down list)	<ul style="list-style-type: none"> <li>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.</li> <li>Get selected text: Retrieves text from the selected item.</li> <li>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.</li> <li>Expand: Expands the combo box.</li> <li>Click: Use this action to select the captured object.</li> </ul>

Object	Actions
	<ul style="list-style-type: none"> <li>• Left click: Use this action if the Click action does not work during runtime.</li> <li>• Right click: Use this action to perform the right-click operation on the captured object.</li> <li>• Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Scroll bar (within a combo box)	<ul style="list-style-type: none"> <li>• Scroll Up: Performs the scroll up operation. This action is similar to clicking the scroll up button one time.</li> <li>• Scroll Down: Performs the scroll down operation. This action is similar to clicking the scroll down button one time.</li> <li>• 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.</li> <li>• 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.</li> <li>• Left click: Use this action if the Click action does not work during runtime.</li> <li>• Right click: Use this action to perform the right-click operation on the captured object.</li> <li>• Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
RadioButton	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get status: Retrieves whether the radio button is selected. Returns selected or deselected.</li> <li>• Select: Use this action to select the captured radio button.</li> <li>• Left click: Use this action if the Click action does not work during runtime.</li> <li>• Right click: Use this action to perform the right-click operation on the captured object.</li> <li>• Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
Table	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Get table: Retrieves the table data and saves it to a table variable.</li> </ul> <p style="color: blue;"><a href="#">Example of extracting data from a web table</a></p> <ul style="list-style-type: none"> <li>• 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 <b>1</b></li> </ul>

Object	Actions
	<p>in the Row field and  <input type="text" value="2"/> in the Column field.</p> <ul style="list-style-type: none"> <li>Get total rows: Retrieves the number of rows that contain values.</li> <li>Get total columns: Retrieves the number of columns that contain values.</li> <li>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  <input type="text" value="0"/> in the Row field and  <input type="text" value="1"/> in the Column field.</li> </ul> <ul style="list-style-type: none"> <li>Click: Use this action to select the captured object.</li> <li>Left click: Use this action if the Click action does not work during runtime.</li> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>
TextBox	<ul style="list-style-type: none"> <li>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.</li> <li>Set text: Enters the text you have specified in the captured field. It supports credentials.</li> </ul> <p><a href="#">Credentials and credential variables in the Bot editor</a></p> <ul style="list-style-type: none"> <li>Append text: Adds text at the end of existing text in the captured field, instead of overwriting it.</li> <li>Click: Use this action to select the captured object.</li> <li>Left click: Use this action if the Click action does not work during runtime.</li> <li>Right click: Use this action to perform the right-click operation on the captured object.</li> <li>Double click: Use this action to perform the double-click operation on the captured object.</li> </ul>

## Use variable anchor

The variable anchor in the AI-Sense 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.

## Procedure

1. Create a new bot or open an existing bot for which you want to record a task.
  2. Click the AI-Sense Recorder icon next to the Universal Recorder.  
If you are using the AI-Sense Recorder for the first time, the system downloads the required dependent files on your device, which might take some time.
  3. In the Automation Anywhere Recorder dialog box, select an option from the window or URL list to specify the application window you want to use for recording.  
If you opened an application recently and it is not available in the list, click the Refresh icon.
  4. Click Start AI-Sense recording.  
The system analyzes the application window you selected to identify the UI objects on that window. After analyzing the window, when you move the mouse pointer on an object, that object is highlighted with a box.
  5. Click an object or area on the application window that is not highlighted.
  6. In the Control Selection dialog box, select Variable from the Type list.
  7. Select an option from the Anchors list to select the associated text with the object you have selected.
  8. Click OK.
  9. Click End recording 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.
10. 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](#)

### 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](#)
- Record a bot

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[Record a task with the Universal Recorder](#)|[Record a task with AI-Sense Recorder](#)

- [Schedule a bot](#)
- [Copy a bot](#)
- [Export a bot](#)
- [Import a bot](#)
- [Check in a bot](#)
- [Check out a bot](#)

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](#)
- [Schedule a bot](#)

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 are 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.
- [Considerations for running a bot](#)  
There are certain considerations you have to keep in mind when running a 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.

- [Check out a bot](#)  
Check out TaskBot files or folders from the public workspace to create an editable copy of the bot.
- [Preload packages](#)  
You can preload packages on your local device to shorten the bot runtime.
- [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.
- [Editing bots](#)  
Edit bot logic using the Bot editor to add, modify, or delete actions and automation steps.
- [Attach work item template to TaskBot](#)  
Attach a work item template to a TaskBot to use the TaskBot in workload automation.
- [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.

## Run a bot

You can test an automated process by running a bot.

## Procedure

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.

## 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.

## 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.

## Prerequisites

- 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.

## Procedure

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, open 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.

## Prerequisites

- 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 folder.

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.

## Procedure

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.

## 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.

## Procedure

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.

## Procedure

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](#)

## Procedure

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](#)

Related tasks

[Use Work Item variables](#)

Related reference

## Workload package

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.

From Bots > Packages the following action buttons are enabled for all users:

### Add package

Browse to the package file to upload to the Enterprise Control Room.

Bot Creators with AAE\_Basic permission can select specific packages to use within a bot.

- [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.

## 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.

### Prerequisites

You need to have AAE\_Basic permission.

Tip: For existing bots, follow these steps to update to the default package.

### Procedure

1. Open or create a new bot from Bots > My bots.
2. Click the vertical ellipsis 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

Keys	Action
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](#)

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](#)

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](#)

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](#)

## [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.

## [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:

## Using 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

Use the actions in the Clipboard package to perform operations on the Clipboard variable. [Clipboard package](#)

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](#)

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.

Variable	Description
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.
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.
Separator	Demarcates a separation between values with a <sep> value.
Tab	Creates large space.

## System settings/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.
AATaskName	Returns the path and name of the currently running TaskBot. For example, /Bots/Finance/combineSheets.atmx.
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 <a href="#">Wait package</a>
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 <a href="#">Wait package</a>
OSName	Returns the operating system. For example, Windows 10 64-bit.

Variable	Description
TotalRAM	Returns the total amount of RAM available.

Note:

- 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](#) and [Using a dictionary variable for PDF properties](#).
- 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 string 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](#)

Note: Variables cannot be named Java keywords such as String, Boolean, Integer, Public, and Finally.

The following tables include recommendations for naming variables, in which each variable is prefixed with a lowercase character to indicate the variable data type.

## Simple variable types

Variable type with naming recommendation	Description	Use examples
Any aMyVariableName	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.	<a href="#">Example of using the Run action</a>
Boolean	Stores either a True or False value.	

Variable type with naming recommendation	Description	Use examples
bMyVariableName		
Credential cMyVariableName	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.  <a href="#">Credentials and credential variables in the Bot editor</a>	
DateTime dtMyVariableName	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.  <a href="#">Date time formats</a>
File fMyVariableName	Stores a file path.	
Number nMyVariableName	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.  <a href="#">Random number action</a>	You can remove the digits following the decimal when converting the value to a string.  <a href="#">Number to string action</a>
String sMyVariableName	Stores alphanumeric, character, and empty values. It can hold up to 65535 UTF-8 characters.	You can compare the value in a String variable to an empty String variable.  <a href="#">Example of using a conditional</a>
Window wMyVariableName	Stores a window title and URL.	Some actions, such as the Capture screen action, require you to create a Window variable to store the handle to a specified window title and URL.  <a href="#">Example of extracting data from a table</a>

## Complex variable types

The variable types described below store multiple values of a simple variable type.

Note: Complex variables can be configured to store data in the any variable type. The any variable type enables a bot to pass different types of data to the same dictionary or list variable including Boolean, numeric, and string.

Variable type with naming recommendation	Description	Use examples
Dictionary dMyVariableName	Stores data in the form of key-value pairs. The value can be boolean, number, or string.	<ul style="list-style-type: none"> <li>• <a href="#">Using dictionary variable email properties</a></li> <li>• <a href="#">Using a dictionary variable PDF properties</a></li> </ul>
List lMyVariableName	Stores a sequence of boolean, number, or string values.	
Record rMyVariableName	Stores a single row of values extracted from a table. The values can be boolean, datetime, number, or string.  <a href="#">Record variable</a>	<a href="#">Example of entering data into a form from a worksheet</a>
Table tMyVariableName	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 extracting values from a <a href="#">CSV file</a> , <a href="#">Excel file</a> , or a <a href="#">Web form</a> .

#### Related tasks

[Create a variable](#)  
 Related reference  
[Boolean package](#)  
[Data Table package](#)  
[Datetime package](#)  
[Dictionary package](#)  
[List package](#)  
[Number package](#)  
[String package](#)  
[Type casting](#)  
[Recursive expressions](#)

## Create a variable

Create a variable to store values.

### Procedure

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](#)
- 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](#).

- 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](#).

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, `$myVariableName$`.

## Next steps

[Build a Go be Great bot](#): 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	<ul style="list-style-type: none"> <li>invert: Converts the Boolean value to the opposite value (True to False and False to True).</li> <li>toNumber: Converts the Boolean value to a numeric value (True to 1 and False to 0).</li> <li>toString: Converts the Boolean value to a string value.</li> </ul>
Number	<ul style="list-style-type: none"> <li>decrement: Decreases the number value by one.</li> <li>increment: Increases the number value by one.</li> <li>toString: Converts the number value to a string value.</li> </ul>
String	<ul style="list-style-type: none"> <li>length: Returns the number of characters in the string as a numeric value.</li> <li>lowercase: Converts the characters in the string to lowercase.</li> <li>reverse: Reverses the characters in the string.</li> <li>toBoolean: Converts the string value to a Boolean value.</li> <li>toNumber: Converts the string value to a number value. The limits of the String to Number action apply here.</li> </ul> <p>See <a href="#">String to number action</a>.</p> <ul style="list-style-type: none"> <li>trim: Trims blanks and whitespaces from the string.</li> <li>uppercase: Converts the characters in the string to uppercase.</li> </ul>

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](#)

## 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 `r.CurrentRow`. To retrieve the value from the first column of each row, use either the index number `$r.CurrentRow[0]$` or name `$r.CurrentRow{CustomerName}$`.

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 from Chinese, Japanese, and Korean languages that can be used in a variable name.

Language	Characters	Range
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
Korean	Hangul Syllables	U+AC00 - U+D7A3

Language	Characters	Range
Latin	a-z	U+0061 - U+007A
	A-Z	U+0041 - U+005A
Numbers	0-9	U+0030 - U+0039
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](#)

## Procedure

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](#)

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](#)

Related tasks

[Define Work Item structure](#)

[Attach work item template to TaskBot](#)

Related reference

[Workload package](#)

## 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 insert a credential variable 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](#)[Edit a credential](#)

## 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.

### Prerequisites

- 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.

### Procedure

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.

## Next steps

### [Example of building a bot that uses credential variables](#)

Perform the steps in this task to learn how to pass values securely between bots.

Related reference

[Recorder package](#)

[Credentials and credential variables in the Bot editor](#)

## 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.

### Prerequisites

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](#)

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.

### Procedure

In the bot that you built for [Example of building a bot that uses credentials](#), 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.

0. Open a new bot.

- a) Click Create new > Bot.
- b) Enter a bot name and click Create and edit.

1. 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.

2. Click Save and Run.

Related tasks

[Create a variable](#)

Related reference

[Task Bot package](#)

[Credentials and credential variables in the Bot editor](#)

## 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](#)

- Update the default value as a non-admin

### [Overwrite the default value](#)

- 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.

### Procedure

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](#)

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.

## Procedure

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.

- [Upload bot dependencies](#)  
You must upload all the files that are required to run a bot successfully to the Enterprise Control Room.
- [Add bot dependencies](#)  
You must add the files that are required to run a bot as its dependencies.
- [View bots dependencies](#)  
You can view the files and bots that are added to a bot as its dependencies.

### Related tasks

[Upload bot dependencies](#)

[View bots dependencies](#)

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Related reference  
[Bot dependencies](#)

## Upload bot dependencies

You must upload all the files that are required to run a bot successfully to the Enterprise Control Room.

### Procedure

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](#)  
[View bots dependencies](#)

## Add bot dependencies

You must add the files that are required to run a bot as its dependencies.

### Prerequisites

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.

### Procedure

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](#)

## [Upload bot dependencies](#)

### View bots dependencies

You can view the files and bots that are added to a bot as its dependencies.

### Procedure

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](#)

[Upload bot dependencies](#)

## 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](#)

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](#)

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](#)

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](#).

## Resources

To learn more, search for the Hello A2019 Bot: Getting Started with Building Bots course in [Automation Anywhere University: RPA Certification Courses \(A-People login required\)](#).

## 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!

### Prerequisites

To build a bot you must already have done the following:

- [Install Bot agent and register device](#)
- [Set user device credentials](#)

### Procedure

If you have already completed the steps in [Create your first bot](#), 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\.
    - e) Click Create and Edit.
  2. Insert a [Message box package](#) 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.
    - d) Click the Apply button to save your message edits.

The Message Box action is added to the flowchart in the Bot editor.
  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.

0. 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.

1. 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.

2. Click Apply.

3. Click Save.

4. Click the Run icon.

The bot generates a pop-up Message box with the text Say Go be Great! with a variable.

## Next steps

After you successfully run your bot, progress to [Build a basic bot that uses a desktop application](#).

## 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.

## Prerequisites

To build a bot you must already have done the following:

- [Install Bot agent and register device](#)
- [Set user device credentials](#)

## Procedure

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.

d) Click Apply.

The Calculator window is saved to the variable `window-1`.

e) Drag the Message box action into the If container.

f) In the Enter the message to display field, enter

`The calculator is running`

g) Click Apply.

h) Drag the Window > Activate action into the If container below the Message box action.

i) In the Window field, insert the `window-1` variable.

j) Click Apply.

3. Insert an alternative sequence that opens the calculator.

a) Double-click the If > Else action.

b) Click Apply.

c) Drag the Message box action into the Else container.

d) In the Enter the message to display field, enter

`The calculator is not running`

e) Click Apply.

f) Drag the Application > Open program/file action into the If container below the Message box action.

g) In the Location of the program/file field, enter

`C:\Windows\System32\calc.exe`

h) Click Apply.

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`

e) Click Apply.

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:

## Procedure

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 Apply.
  - e) Click Save.
  - f) 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.
  - j) Click Apply.

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.
  - f) Click Apply.
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`.
  - c) Click Apply.

- 
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.

- [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.

- [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.

- [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.

- [Run TaskBot to merge Excel sheets](#)

Download and run sample TaskBot from the Bot Store to merge two 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.

- [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.

- [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.

- [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.

## 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:

### Procedure

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.
  - e) Click Apply.
- 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.
  - c) Click Apply.
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.
  - e) Click Apply.
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.
  - e) Click Apply.
- 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.
  - k) Click Apply.
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.
  - f) Click Apply.
9. Click Save.

Related reference

[Excel advanced package](#)

[Loop package](#)

[Recorder package](#)

## 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.

### Prerequisites

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.

### Procedure

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.
  - d) Click Apply.
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.
  - e) Click Apply.
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.
  - f) Click Apply.
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`
- c) Click Apply.
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`
  - d) Click Apply.
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](#)  
[If package](#)  
[Message box package](#)

## 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.

### Prerequisites

To run Python script from Enterprise A2019, you must already have the latest version of Python 3.x installed on your device.

### Procedure

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  
`Argument`  
in the Name field.

Recommendation: Prefix the variable name with a lowercase character to indicate the variable data type.

### Variable naming

- c) Select the List type and String subtype.
- d) In the Default value field, enter the following values:

a) Value at 0:

Go

b) Value at 1:

Be

c) Value at 2:

Great

d) 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
```

d) Click Apply.

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.
- e) Click Apply.

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.
- d) Click Apply.

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 Python wrapper log, navigate to C:\ProgramData\AutomationAnywhere\BotRunner\Logs\python3wrapper.log. This file stores data on the Python code execution and is useful for debugging.

Related reference

[Python Script package](#)

## Message box package

# 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.

## Prerequisites

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

## Procedure

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 NewProductNames.csv file that you just created.

- a) 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.
  - e) Click Apply.
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.
  - f) Click Apply.
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`
  - d) Click Apply.
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.
  - f) Click Apply.
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.
  - e) Click Apply.
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].
  - f) Click Apply.
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 rNewProductName{Name}
- e) Click Apply.
- f) Double-click or drag the Excel Advanced > Go to cell action.
- g) In the Session name field, enter

**session 1**

- h) From the Active cell drop-down list, select One cell below.
- i) Click Apply.

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) Click Apply.
- e) Double-click or drag the CSV/TXT > Close action.
- f) In the Session name field, enter

**session 1**

- g) Click Apply.

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](#)

[Excel advanced package](#)

[If package](#)

[Loop package](#)

## Run TaskBot to merge Excel sheets

Download and run sample TaskBot from the Bot Store to merge two spreadsheets.

### Prerequisites

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

### Procedure

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](#)

## 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.

### Prerequisites

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

### Procedure

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.
  - d) Click Apply.
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.
  - e) Click Apply.
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 ('$rExcelCurrentRow[0]$', '$rExcelCurrentRow[1]$', '$rExcelCurrentRow[2]$');
```

- f) Click Apply.
5. Disconnect from the database:
- a) Drag the Database > Disconnect action below the Loop container.
  - b) Click Save.
6. Close the spreadsheet:
- a) Double-click or drag Excel advanced > Close Spreadsheet action.
  - b) Click Save.

#### Related reference

[Database package](#)

[Excel advanced package](#)

[Loop package](#)

## 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 operation, and edit the parent bot to call whichever one you want to use.

#### Reusability

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.

## Procedure

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](#)

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.
  - d) Click Apply.
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.
  - d) Click Apply.
5. Click Save.
6. Click Close.

Build the parent bot.

0. 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.

1. 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.
2. 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:
    - d) v1: 12
    - e) v2: 54
  - f) 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.
  - g) Click Apply.
3. 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.
  - c) Click Apply.
4. Click Save.
5. Click Run.  
The bot runs and the Message Box appears containing the sum 66.

#### Related reference

[Task Bot package](#)

[Message box package](#)

## 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.

### Procedure

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**

- 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**

- Select the SOAP version of the endpoint that you specified in the Port field.

Choose from 1.1 or 1.2.

- 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**

- 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.

- 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.

- Optional: Provide a Client certificate by selecting a file from the Control Room or your desktop, or insert a variable.

- Optional: Provide custom headers.

- Optional: Provide a file to save the XML output.

- 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.xml  
soap.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. Click Apply.
16. 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](#)

## 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.

### Prerequisites

Configure an empty string variable named `sNull`.

[Create a variable](#)

### Procedure

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 Apply, and then 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.
- j) Click Apply.
4. Specify the file in which to save the data.
- Double-click or drag the Data Table > Write to file action.
  - From the Data table name list, select `tLanguages`.
  - Provide a file path to create a CSV file.  
 For example, `C:\Users\<username>\Desktop\LanguagesTable.csv`.
  - Select the Create folders/files if it doesn't exist option.
  - Select to overwrite the existing file.
  - Click Apply.
5. Specify the file that holds the extracted data.
- Double-click or drag the CSV/TXT > Open action.
  - Provide the file path to the file specified in step 4.
  - Select the Contains header option to exclude the first row.
  - Click Apply.
6. Iterate through each row of the file.
- Double-click or drag the Loop action.
  - Select the For each row in CSV/TXT iterator.
  - In the Assign the current row to this variable field, create the variable `r.CurrentRow`.
  - Click Apply.
7. Specify the data to populate the Bot Insight dashboard.
- Double-click or drag the Analyze > Open action, and then click Apply.
  - Double-click or drag the String > Assign action.
  - Enter  
`$r.CurrentRow[0]$`  
 as the source string.  
 Press F2 to open the variables menu.
  - In the Select destination string variable field, create the variable `sLanguage`, and then click Apply.
  - 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.
  - Enter  
`$r.CurrentRow[1]$`  
 as the source string.  
 Press F2 to open the variables menu.
  - Enter  
`,`  
 in the Find string field.
  - Select the Not a regular expression option.
  - In the Replace with field, enter

`$sNull$`

- j) In the Assign the output row to variable field, create the variable `sPopulation`, and then click Apply.
  - 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`, and then click Apply.
  - n) Double-click or drag the Analyze > Close action.
  - o) Select the following variables, and then click Apply:
    - p) `sLanguage`
    - q) `nPopulation`
8. Click Save and then Run.
9. Click Analyze.  
The Bot Insight window appears.

## Next steps

Learn more about dashboards.

### Bot Insight dashboards

Related reference

[Analyze package](#)

[Browser package](#)

[Recorder package](#)

[Data Table package](#)

[CSV/TXT package](#)

[Loop package](#)

## 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](#)

## 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.
- Global case management: View process requests and tasks. However, they cannot create a request or submit a task.

### Manager

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.
- 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.

## Roles

### [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.

### [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).

### [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.

## 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.

### Prerequisites

Ensure that you have purchased the AARI user license for your business users.

Note: These roles are only applicable for the web interface.

### Procedure

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	<p>Retain the default None.</p> <p>The user with administrator role has access to the Enterprise Control Room and AARI on the web.</p>
Manager	<p>Retain the default None.</p> <p>You can optionally assign the AARI user license to create a request or submit tasks.</p> <p>The user with manager role has access to AARI on the web.</p>
User	<p>Assign the AARI user license. You can also optionally assign the attended Bot Runner license to run local bots or use the desktop interface.</p> <p>The user has access to AARI on the web.</p>

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.

## 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](#)
- [Check out an AARI process](#)

## 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](#)
- [Export an AARI process](#)

- [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.

- [Create an AARI process](#)

Create an Automation Anywhere Robotic Interface (AARI) process workflow to address your business requirements. The process is created in a process editor that incorporates human and bot tasks.

- [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.

- [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.

- [Import an AARI process](#)

You can import an Automation Anywhere Robotic Interface (AARI) process from one Enterprise Control Room to another.

- [Export an AARI process](#)

You can export an Automation Anywhere Robotic Interface (AARI) process from one Enterprise Control Room to another.

## 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.

## Prerequisites

- 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.

## Procedure

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.

## Next steps

[Create an AARI process](#)

### Create an AARI process

Create an Automation Anywhere Robotic Interface (AARI) process workflow to address your business requirements. The process is created in a process editor that incorporates human and bot tasks.

### Prerequisites

- You must have a Bot Creator license.
- You must be assigned a custom role with the create folder permission.

### Procedure

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.
2. Add an initial form to the process by clicking Start.
3. From the Start panel on the right, 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) Click Apply.
4. Add Bot Task to the process by dragging the Bot Task from the Elements panel on the left (below Start).
5. From the Bot task panel on the right, 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 will appear in the web interface as a reference.
  - c) Browse and select the TaskBot.
  - d) Select the check box in Input values and insert a variable.  
The variable input expected by the bot is mapped with the variable that will be populated when creating the request.
  - e) Click Apply.
6. Add a Condition to the process by dragging the Condition from the Elements panel on the left (below Bot Task).  
You can choose If/Else pair or Else if.
7. From the Condition panel on the right, perform these steps:
  - a) Optional: Add a description in the Description field.
  - b) Optional: Add a message in the Display message field.
  - 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 Human Task from the Elements panel on the left (below the Condition).

9. From the Human task panel on the right, 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) In the Select form field, browse and select the second form created.

This form will display the result.

    - d) In the Feed data into form field, choose the following actions:
      - e) Click Add element and insert the variable. This is the output variable.
      - f) Click Add button and enter the Button label and Button style.
  10. Add the End Process by dragging the End point from the Elements panel on the left (below Human Task).
- You can choose either End Process or Go to.
- Note: If you choose Go to, you have to select a task to run when the process reaches the Go to element.
11. From the End point: End case panel on the right, perform these steps:
    - a) Choose the type in the End case type field (completed, failed, or canceled).
    - b) Optional: Add a message in the Display message field.
    - c) Click Apply.
    - d) Click Save to save the process.
  12. 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](#)
- [Create an AARI form](#)

## 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.

## Prerequisites

- 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.

## Procedure

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.

## Prerequisites

- 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

## Procedure

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.

## Prerequisites

- 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.

## Procedure

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.

## Prerequisites

- 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](#)

- 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.

## Procedure

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.

## Next steps

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.

- [Assign a task](#)

The Automation Anywhere Robotic Interface (AARI) manager and user can assign specific tasks to their team.

- [View and search for a process](#)

The AARI user can view, pin, or search their assigned processes.

- [Filter and search for a request](#)

When an AARI user has created many requests, they can quickly search for a specific request.

- [Filter and search for a task](#)

When the AARI user has created many tasks, they can quickly search for a specific task.

- [Configure device pools for AARI on the web](#)

You can configure a device pool in the Enterprise Control Room to use in AARI.

- [Assign a process to an AARI team](#)

An AARI admin can add managers to assign a process to a team in AARI.

## 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.

## Prerequisites

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.

## Procedure

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.

## Assign a task

The Automation Anywhere Robotic Interface (AARI) manager and user can assign specific tasks to their team.

## Prerequisites

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.

## Procedure

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.

## Prerequisites

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.

## Procedure

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	<p>View your assigned process in the Select a process window.</p> <p>Important: A list of processes is available in the All tab by default and are assigned to your team by the manager.</p>

Option	Steps
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.

### Prerequisites

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.

### Procedure

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	a) Click on a column.  You can choose from Status, Request ID, Process, Title, Created, or Tag.  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 requests.

Option	Steps
Search	<p>a) Click Search title. b) Search a request title.</p> <p>The search bar dynamically searches for common keywords.</p> <p>c) Optional: Click x to clear keywords. d) View the searched requests.</p>
Filter	<p>a) Click Filter. b) In the dedicated filter window that appears, configure your content from these filters:</p> <ul style="list-style-type: none"> <li>a) Select a status in the Status option.</li> </ul> <p>You can choose from Open, Closed, Failed, and Cancelled.</p> <ul style="list-style-type: none"> <li>b) Enter an ID in the Request ID field.</li> <li>c) Enter a process name in the Process field.</li> <li>d) Enter a tag name in the Tags field.</li> </ul> <p>Note: When you confirm your search criteria for the Request ID, Process, and Tags fields, you create a custom filter tag.</p> <ul style="list-style-type: none"> <li>c) Optional: Click x to discard any custom filter tags.</li> <li>d) Optional: Click Reset to discard all changes.</li> <li>e) Click Apply.</li> <li>f) View your filtered requests.</li> </ul>

## Filter and search for a task

When the AARI user has created many tasks, they can quickly search for a specific task.

### Prerequisites

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.

### Procedure

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	<p>a) Click on a column.</p> <p>You can choose from Status, Task Name, Assignee, Request ID, Title, or Task Created.</p> <p>The column is sorted to ascending order by default.</p> <p>b) Optional: Click the same column again.</p> <p>The column is now sorted to descending order by default.</p> <p>c) View your sorted tasks.</p>
Search	<p>a) Click Search title.</p> <p>b) Search a task name.</p> <p>The search bar dynamically searches for common keywords.</p> <p>c) Optional: Click x to clear keywords.</p> <p>d) View the searched tasks.</p>
Filter	<p>a) Click Filter.</p> <p>You can also filter your tasks and choose from My Completed tasks, My Pending tasks, and Unassigned tasks.</p> <p>b) Click Advanced filter.</p> <p>c) In the dedicated filter window that appears, configure your content from these filters:</p> <ul style="list-style-type: none"> <li>a) Select a status in the Status option.</li> </ul> <p>You can choose Pending and Completed.</p> <ul style="list-style-type: none"> <li>b) Enter a name in the Assignee field.</li> <li>c) Enter an ID in the Request ID field.</li> <li>d) Enter a name in the Title field.</li> </ul> <p>Note: When you confirm your search criteria for the Assignee, Request ID, and Title fields, you create a custom filter tag.</p> <p>d) Optional: Click x to discard any custom filter tags.</p> <p>e) Optional: Click Reset to discard all changes.</p> <p>Tip: You can also navigate to Filter &gt; Reset filter for the same results.</p> <ul style="list-style-type: none"> <li>f) Click Apply.</li> </ul> <p>g) View your filtered tasks.</p>

## Configure device pools for AARI on the web

You can configure a device pool in the Enterprise Control Room to use in AARI.

### Prerequisites

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 a role](#)

- a) Set your permissions to View my bots 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.

### Procedure

Follow these steps to create a device pool in the Enterprise Control Room and configure it for AARI on the web.

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](#)

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. Log out of Enterprise Control Room.
7. Log in to the web interface as an AARI admin.
8. Navigate to the configuration page.
9. Click Edit device pool.
10. Select your device pool in the Select a device pool field.
11. Add your unattended users to your device pool.
12. Click Apply.
13. Verify the Status of your device pool.

The status shows as Connected, Available, or None depending on your connection.

## Assign a process to an AARI team

An AARI admin can add managers to assign a process to a team in AARI.

### Prerequisites

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.

## Procedure

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 in the search bar for an AARI user.  
You can add more than one user if required.
18. Click Apply.
19. Click the + icon.
20. Click Add processes.
21. In the Assign Processes window, select your assigned process.
22. 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 user | Enterprise A2019 licenses](#)
  - The user logs in to the Enterprise Control Room to start building bots.  
[Install Bot agent and register device | Get started building bots](#)

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](#)

- Link the form to a newly created bot or an existing bot using the Bot editor interface.

[Add a form to bot](#)

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](#)

• [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.

• [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.

• [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.

## 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: Using Interactive forms

• [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.

- [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.

## 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.

## Procedure

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.
  - [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.
  - [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.
  - [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.
  - [Using the Dropdown element](#)  
Use the Dropdown element in the form builder to provide multiple options in the form during bot runtime.
  - [Using the Dynamic element](#)  
Use the Dynamic element in the form builder to display content that is not part of the form itself during bot runtime.
  - [Using the Label element](#)  
Use the Label element in the form builder to add a read-only field in the form during bot runtime.
  - [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.
  - [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.
  - [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.

- [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.

- [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.

- [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.

- [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.

- [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.

- [Using the Text Box element](#)

Use the Text Box element in the form builder to insert a text box in the form.

## Using the Button element

Use the Button element in the form builder to validate or cancel a form during bot runtime.

### Procedure

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 in the Hint text option fields.

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: 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 Checkbox element

Use the Checkbox element in the form builder to enable users to select multiple options in a form during bot runtime.

## Procedure

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.

## Procedure

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.  
Optional, select the Use current date as default value to set your system date as the default value.
6. 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.
7. Use the Date types drop-down menu to select the date format.
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 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.

### Procedure

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.

## Procedure

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 element

Use the Dynamic element in the form builder to display content that is not part of the form itself during bot runtime.

## Procedure

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 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.  
If a form has a Dynamic element, you can use the Dynamic area action to render this field. See [Interactive forms package](#).

## Using the Label element

Use the Label element in the form builder to add a read-only field in the form during bot runtime.

### Procedure

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.

### Procedure

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.

### Procedure

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 Password into the form.
4. Enter the name of the element in the Element label field.
5. Enter the minimum and maximum number of characters that users can enter in this field during bot runtime.
6. Optional: Enter the hint text and tooltip for the check box element.
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.

# 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.

## Procedure

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.

## Procedure

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 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.

### Procedure

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 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: 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.

## 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.

### Procedure

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 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: 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.

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 the sales information, enter Sales. The snapshot file is then saved with the word Sales at the end.

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 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.

### Procedure

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 Table into 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 out-patients details if the table is used to capture a list of out-patients.

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. Optional: Enable any of the following Advance behavior options:
  - Select Make field required check box to ensure users select this element during bot runtime.
  - Select Include table actions check box to enables users to add, remove or edit the table rows 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 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.

### Procedure

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.

### Procedure

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 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. 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 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.

### 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.

## Procedure

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 Apply and then save the bot.

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](#)

## 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.

- [Add an email trigger](#)

Use email triggers to start a bot when a new email message is received in a specified email service.

- [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.

- [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.

- [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.

#### Related reference

[Trigger loop package](#)

### 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.

### Procedure

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	<p>Click Outlook.</p> <p>Microsoft Outlook is set as the email service and the bot is triggered when you receive a new email.</p>
Email server	<p>Click Email server.</p> <p>a) Enter the email service Host information.</p> <p>For example, if you are using Office365 as your email service, enter <code>Outlook.office365.com</code></p> <p>b) Select IMAP or POP3.</p> <p>IMAP and POP3 are protocols used to connect to the mail server that enables you to read your emails through an email client.</p> <p>Note: The POP3 protocol has a known limitation where any new calendar invite can also trigger the bot.</p> <p>c) Enter the configured port number for your email server.</p>

Server type	Steps
	<p>d) Select one of the following user authentication methods to sign in to the email server:</p> <ul style="list-style-type: none"> <li>• e) Credential: Click Pick to select the stored Username and Password.</li> </ul> <p style="text-align: center;"><a href="#">Credentials and credential variables in the Bot editor</a></p> <ul style="list-style-type: none"> <li>• f) Insecure string: Enter the username and password.</li> </ul> <p>Note: The Email in folder does not support sub-folders when you set the protocol as POP3 for Email Server,</p>
EWS server	<p>Click EWS server.</p> <p>a) From the Microsoft Exchange Version drop-down menu, select your current version.</p> <p>For example, if you are using Microsoft Exchange Service Pack 2, select Exchange2010_SP2 as your email service.</p> <p>b) Select one of the following user authentication methods to sign in to the email server:</p> <ul style="list-style-type: none"> <li>• c) Credential: Click Pick to select the stored Username and Password.</li> </ul> <p style="text-align: center;"><a href="#">Credentials and credential variables in the Bot editor</a></p> <ul style="list-style-type: none"> <li>• d) Insecure string: Enter the username and password.</li> </ul>

7. 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.

8. 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.
9. Click Apply.
10. Click Run > Run with triggers.

Microsoft Outlook, Email server or EWS server is set as the trigger to start the bot for new emails.  
Note: Bots with email triggers cannot be deployed on unattended Bot Runner machines.

### 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.

## Procedure

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 > Files & folders.
5. Drag File trigger into Drag a trigger here.
6. Click Browse and select the Sales update.xls file.
7. From the Start the bot when the file is drop-down menu, select modified.  
This sets the trigger for the bot.
8. 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

9. Click Apply.
10. Click Run > Run with triggers.  
Whenever a user modifies the Sales update.xls, the bot is triggered.

### Related reference

[Using event triggers](#)

### 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.

## Procedure

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.

## Procedure

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.
9. 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.

10. Click Apply.
11. 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

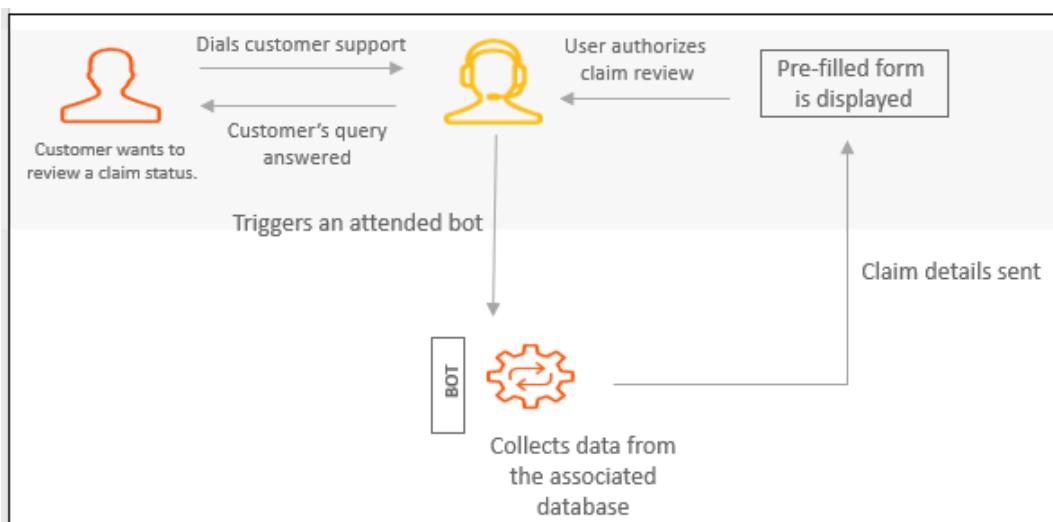
In this example, a front desk executive of an insurance company responds to a call from an existing customer who wants to understand the policy details and its validity. The executive uses a hot key to trigger a bot that retrieves the customer's information.

## Prerequisites

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.

## Procedure

1. 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.
  2. 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.
  3. 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.

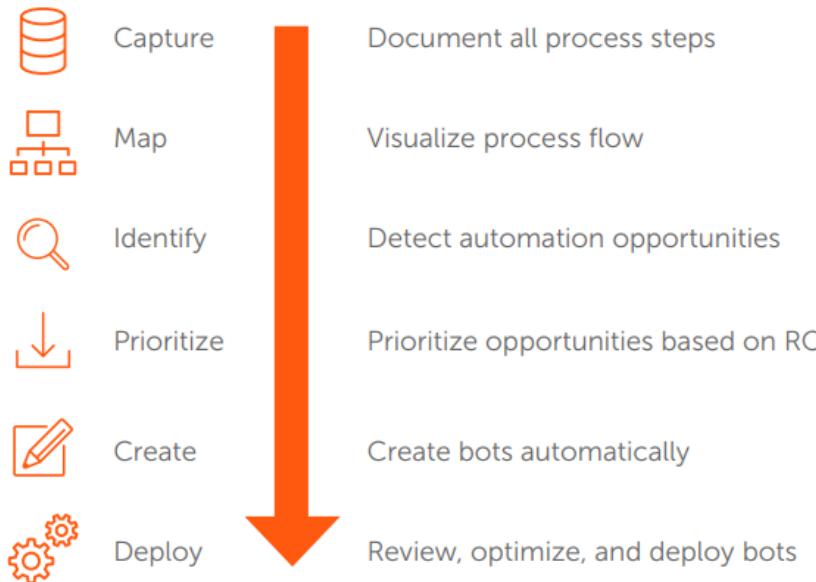
Intelligent automation begins with discovering and identifying patterns in business processes before RPA can begin. Process discovery solutions such as Discovery Bot align business workers to uncover automation opportunities that can optimize the return on your RPA investment.

## 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.

## Prerequisites

- Ensure the system requirements are met.

### [Prerequisites for Discovery Bot](#)

- Install and configure Discovery Bot for users in your organization.

### [Enterprise A2019 On-Premises Enterprise Control Room installation](#)

## Procedure

### 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](#)
- [Supported licenses for Discovery Bot](#)
- [Create users for Discovery Bot](#)
  - [Create multi-role users for Discovery Bot](#)
  - [Create a custom role for Discovery Bot](#)
  - [Assign the Discovery Bot custom role to a user](#)

### 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](#)

### 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](#)
- [Record a Discovery Bot business process](#)

### 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](#)
- [Review and compare recording data](#)

### 5. Create opportunities. Merge specific recordings or steps as required.

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

### 6. Prioritize opportunities and generate bots automatically.

#### [Review opportunities and convert to bot](#)

## 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.

Users with the Discovery Bot admin privileges cannot view the recording data of any process, participate in the recording analysis, or create new opportunities.

**Discovery Bot analyst**

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..](#)

### 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](#)
- Register your device and install the latest Bot agent version on your machine.

#### [Install Bot agent and register device](#)

- To record processes using Google Chrome, the Chrome plug-in must be installed.

#### [Supported browsers for Enterprise A2019](#)

- 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](#)

- Verify the Discovery Bot recorder requirements are completed.

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

## 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 [Enterprise A2019 On-Premises Enterprise Control Room installation](#).

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](#).

## 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.

## 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	<ul style="list-style-type: none"> <li>• Create, view, update, and delete processes.</li> <li>• Assign Discovery Bot analyst and business user to processes.</li> </ul>	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
		<p>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.</p> <p>If a user is no longer assigned to a process, the user will lose access to the recordings.</p>	Process analyzer
		<p>View all recordings (own and other users), including metadata and annotated steps, for a given process.</p>	Process analyzer
		<ul style="list-style-type: none"> <li>• Create, view, update, and delete manual generated aggregation</li> <li>• View all manually generated aggregations</li> </ul>	Process analyzer
		Create and view own opportunities for a given process.	Process analyzer
		Convert an opportunity to a bot.	<p>Process analyzer for opportunity creation.</p> <p>Bot Creator license is required to convert an opportunity to a bot.</p>
		Export opportunity to Word.	Process analyzer
Discovery Bot user	AAE_Discovery Bot User	<ul style="list-style-type: none"> <li>• Using the Discovery Bot recorder, create or more recordings for an assigned business process.</li> <li>• Update own recording to include annotations for the steps.</li> <li>• Delete one or more steps from own</li> </ul>	Process recorder

Discovery Bot user	System-provided Discovery Bot role	Discovery Bot features	Discovery Bot license required
		<p>recording before submission.</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p>If a user is no longer assigned to a process recording, the user will lose access to the recording data.</p>	

## 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.

### Prerequisites

Ensure that you have purchased the necessary Discovery Bot licenses for your business users before you begin creating users: [Prerequisites for Discovery Bot](#).

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](#).

### Procedure

- 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.

Discovery Bot user	Action
	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.

## Next steps

### [Create a Discovery Bot process](#)

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.

## Prerequisites

Ensure that you have purchased the necessary Discovery Bot licenses for your business users: [Prerequisites for Discovery Bot](#).

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](#).

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
- 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

## Procedure

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

Discovery Bot user	Select this role
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.

## Next steps

[Create a Discovery Bot process](#)

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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.

### Prerequisites

Ensure that you have purchased the necessary Discovery Bot licenses for your business users: [Prerequisites for Discovery Bot](#).

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](#).

#### 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.

### Procedure

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. Scroll to the Discovery Bot section.
8. Select View assigned process at the parent level.  
The child-level permissions are enabled.
9. 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.
10. Click Create role.  
The Discovery Bot custom role is created.

## Next steps

[Assign the Discovery Bot custom role to a user](#)

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.

## Prerequisites

Ensure that you have purchased the necessary Discovery Bot licenses for your business users: [Prerequisites for Discovery Bot](#).

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](#).

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

## Procedure

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.

## Next steps

### [Create a Discovery Bot process](#)

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.

### Prerequisites

- 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.

## Procedure

- Create a process and assign users:
  1. From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
  2. Go to Discovery Bot > Processes.
  3. Click Create Process.  
The Create process page is displayed.
  4. In the General Details tab, enter a Process Name .  
Special characters are not supported. Creating a process with a duplicate name not supported.
  5. Optional: Enter a Process Description.
  6. Click Next to assign users to a process.
  7. Optional: In the Users tab, select the Discovery Bot business user or analyst from the list of Available users.
  8. Click the right arrow to move the roles to the list in the Selected column.
  9. Click Create Process.
  10. Click Next to view the invitation that is sent to users to begin recording processes.
  11. 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.	<p>View, edit, or delete information for a process.</p> <ul style="list-style-type: none"> <li>• Click View process details to view more information about a process, edit and update information, and save changes.</li> <li>• Click Edit process details to edit a process. Enter your changes and click Save changes. Click Close to return to the Processes page.</li> </ul> <p>Note: The name of the process cannot be changed.</p> <ul style="list-style-type: none"> <li>• Click Delete process to delete a process. A message window appears.</li> <li>• Click Yes, delete to delete a process.</li> </ul>

Process tile	Description
	<p>All recordings and associated data are permanently deleted. This cannot be undone.</p> <p>Click No, cancel to return to the Processes page.</p>

- Create a process and add users at a later time:
  1. From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
  2. Go to Discovery Bot > Processes.
  3. Click Create Process.  
The Create process page is displayed.
  4. 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.
  5. Optional: Enter a Process Description.
  6. Click Create Process to create a process without assigning users.
  7. Click Close to exit the page and return to the Processes page.
- Update an existing process and add users.
  1. From your local machine, log in to your Enterprise Control Room as a Discovery Bot administrator.
  2. Go to Discovery Bot > Processes.
  3. Go to the process you want to edit.
  4. Click Edit from the Options icon.
  5. In the Edit process page, click Next to assign users to a process.
  6. In the Users tab, select the Discovery Bot business user or analyst from the list of Available users.
  7. Click the right arrow to move the roles to the list in the Selected column.
  8. Click Save changes.
  9. Click Next to view the invitation that is sent to users to begin recording processes.
  10. 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.

## Next steps

### [Record a Discovery Bot business process](#)

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 and Mac devices. 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 currently does not highlight text for read and write applications, for example, highlighting a text field in Excel.

The Discovery Bot does not highlight the area where you click or enter data with a red highlighted box shown when using the Universal Recorder.

## 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 troubleshooting](#)

### 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.

### Prerequisites

- 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](#)

### Procedure

1. Record a business process:
  - a) From your local machine, log in to your Enterprise Control Room as Discovery Bot business user.
  - b) Go to Discovery Bot > Processes.

The Processes page appears, displaying all processes assigned to the user for recording.

  - c) 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.

  - d) Perform the actions to record.

For example, open an application and fill in a form or open a browser and search a website.

  - e) 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:
  - a) 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.

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: <ul style="list-style-type: none"> <li>• b) Pending: Initial state.</li> <li>• c) Approved: All user-required edits have been completed and recording is ready for review by an analyst.</li> <li>• d) Error: There is an error when storing the recording in the system.</li> <li>• e) Declined: Currently not being used.</li> </ul> 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. Each recorded step's screenshot, application type, keyboard entered text, and annotated user text fields are displayed in the right pane in Recording (ID).  
Optionally, use the mouse pointer to hover over each captured step displayed in the Screenshot field. The crosshair cursor enables you to get a zoomed-in view of the step.
4. Optional: Update the application name used in the process recording in the Application text field.
5. Optional: Update the keyboard entered text used in the process recording in the Data text field.
6. Optional: Update the context associated with the step in the Step description text field.
7. Optional: Delete any step that is not required to be included in the process recording.
8. Repeat the above steps for each step as required.
9. 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.
10. 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.

## Next steps

### Analyzing processes for automation

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.
Application 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 from 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 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.

### Prerequisites

- 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](#)

### Procedure

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.

## Next steps

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

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.

### Prerequisites

- 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](#)

### Procedure

1. Display a view or recording, select steps, and create an opportunity in a linear workflow in the Aggregated tab:
  - a) Select a process from the processes page.  
The last active tab automatically opens.
  - b) 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.
  - c) 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.
  - d) 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.

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.
Average time	The duration, in minutes and seconds format, of the selected steps in the opportunity.
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.

- a)

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.
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.

- a) Click Create view or select a manual view from the Views table.
- b) Mouse over the row level menu in the Views table and click Edit.
- c) 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 shown in the Views table.

Field	Description
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 and drop 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.

## Next steps

### [Review opportunities and convert to bot](#)

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.

### Prerequisites

- 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](#)

- Ensure the analyst is assigned a Bot Creator license to convert opportunities to bots.

#### [Supported licenses for Discovery Bot](#)

### Procedure

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: <ul style="list-style-type: none"> <li>• c) Low</li> <li>• d) Medium</li> <li>• e) High</li> </ul>
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.

- f) Select the required opportunity by sorting, searching, or both from the table using the Search field.
- g) 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 opportunity is created. Click the View bot hyperlink to navigate to the Bot editor page. The opportunity is now converted to a bot for you to review or add actions.

Note: The Convert to bot option is only available if you have the Bot Creator license.

Note: 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 backend. When the PDD is ready for download from the Enterprise Control Room, an email notification is sent to your email address on file.

The document is saved in the Downloads folder on your machine.

## 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.  <a href="#">Create a learning instance in IQ Bot A2019</a>
Option 2:	Click the Train other documents option.	Create and train learning instances for other document types using IQ Bot.  <a href="#">IQ Bot Community Edition quick start guide</a>

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.

- [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.

- [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.

- [Validate documents](#)

This is the final phase of the process where you manually validate error value fields in each document in the validation queue.

## 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](#).

## 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](#)

## 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	-
Total amount	-

## Procedure

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.

## Next steps

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.

### Prerequisites

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.

### Procedure

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.

### Next steps

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.

### Procedure

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.

### Bot developer resources

- [Package Software Development Kit \(SDK\)](#)  
This document explains the requirements and process for creating and uploading an action package to your Enterprise Control Room.
- [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.
- [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.
- [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.

- [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.

## Package Software Development Kit (SDK)

This document explains 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.

[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-annotations-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](#)

For detailed release notes for the SDK Packages, see [Enterprise A2019 Package Development Kit Release Notes](#).

Click a title to read details about each task in the process.

### [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.

### [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.

### [Develop a sample package](#)

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

### [How to examples](#)

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.

### [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.

### [Build and test a custom package](#)

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](#)

## 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.

## Prerequisites

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:

[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-annotations-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.

## Procedure

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](#)

[How to examples](#)

[Annotations](#)

[Build and test a demo package and bot](#)

[Related tasks](#)

[Develop a sample package](#)

## 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: 'mydependentjavafайл.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 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.Exception.InvalidWorkingDirPath"))`.
- 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](#).

## 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 more 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().getResourceAsStream("resource.json");
```

## Related concepts

[How to examples](#)

[Annotations](#)

## Related tasks

[Setting up the Java project](#)

[Develop a sample package](#)

## Develop a sample package

Develop your own package and upload it to an Enterprise Control Room to provide custom actions for bots.

## Prerequisites

Download and extract the contents from [A2019DemoPackage.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](#).

The following high-level tasks provide the basic workflow for creating a package.

## Procedure

1. Create a java class.

This class is the action you plan to publish in your package.

Important: It is required that the class support 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.

## Next steps

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](#).

Related concepts

[Standard coding practices and guidelines for developing packages](#)

[How to examples](#)

[Annotations](#)

[Related tasks](#)

[Setting up the Java project](#)

## How to examples

This section contains code examples and explanations about how to code some basic bot capabilities.

[Return a value from an action](#)

Set the following properties on CommandPkg to store the action output in a variable.

[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.

[Add a condition in a custom package for If condition](#)

Add conditions in a custom package.

[Add an iterator in a custom package for Loop action](#)

Add an iterator in your package for Loop action.

[Add debug logs of custom packages to bot\\_launcher.log file](#)

Logging can be added using log4j. The dependency is already added in the sample build.gradle.

[Handle session in custom package](#)

Actions need to extract the required session from the SessionsMap by the session name.

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](#)

[Annotations](#)

Related tasks

[Setting up the Java project](#)

[Develop a sample package](#)

## 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`

Makes the assignment operation compulsory when it is set to true.

`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| an
d assign the result to {{returnTo}}|",
return_type=DataType.STRING, return_required = true, return_label="Assign the o
utput to variable",
property_name="uppercase", property_description="Converts the string to upper c
ase", 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](#)

## 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| an
d assign the result to {{returnTo}}|",
return_type=DataType.STRING, return_required = true, return_label="Assign the o
utput to variable",
property_name="uppercase", property_description="Converts the string to upper c
ase", property_type=DataType.STRING,

```

```
property_return_type=DataType.STRING) public classUpperCase {

    @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](#)

## 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 = DataT
ype.NUMBER)
```

```

        @GreaterThanOrEqualTo("0") @LessThanOrEqualTo("99999") @Not
Empty @NumberInteger Double waitTimeout) {

    // Logic to check for the condition goes here

}
}

```

Related concepts

[How to examples](#)

## 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.iterator.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.getExtensio
n(fileName)));

    return new DictionaryValue(returnValueMap);
}

public void setFolderPath(String folderPath) {
    this.folderPath = folderPath;
}
}

```

Related concepts  
[How to examples](#)

## Add debug logs of custom packages to bot\_launcher.log file

Logging can be added using log4j. The dependency is already added in the sample build.gradle.

```

@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 session in custom package

Actions need to extract the required session from the SessionsMap by the session name.

SessionsMap instance can be received using the Sessions attribute. The annotation can only be applied to class field and a corresponding public setter is expected. The variable must be of type Map<String, Object>.

```

@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.SessionNameIn
Use", 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 sess
ion", 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](#)

## Annotations

This section provides reference information about the annotations used to create Automation Anywhere packages.

### [Creation and function annotations](#)

List of the available creation and function annotations.

### [Validation annotations](#)

Validates annotated strings and values used in your Java code.

Related concepts

[Standard coding practices and guidelines for developing packages](#)

[How to examples](#)

Related tasks

[Setting up the Java project](#)

[Develop a sample package](#)

## Creation and function annotations

List of the available creation and function annotations.

Annotation	Description
BotCommand	<p>Makes the type eligible to be treated as an <code>action</code>. You can define 3 types of actions <code>commandType</code> property.</p> <ul style="list-style-type: none"> <li>• Command\Action</li> <li>• Condition</li> <li>• Iterator</li> </ul> <p>Examples:</p>

Annotation	Description
	<ul style="list-style-type: none"> <li>• @BotCommand (commandType = BotCommand.CommandType.Iterator)</li> <li>• @BotCommand (commandType = Condition)</li> </ul>
CommandPkg	<p>Makes the type eligible for creation of action package.json. This annotation must be used with BotCommand to take effect.</p> <p>Pkg would participate in the activity only when this annotation is present.</p> <p>Example:</p> <pre>@CommandPkg(label = "Create", name = "createFile", description = "Creates a file", node_label = "{{filePath}}", icon = "file.svg")</pre>
ConditionTest	<p>Method annotated with this annotation will participate in the execution of Condition.</p> <p>This annotation can only be used when the BotCommand has commandType set as Condition.</p> <p>Exactly one method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error.</p>
Execute	<p>Method annotated with this annotation will participate 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.</p> <p>Example:</p> <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")</pre>

Annotation	Description
	<pre>@NotEmpty Boolean isOverwrite) { createFile(filePath, isOverwrite); }</pre>
GlobalSessionContext	<p>Can only be applied to member variables and fetches the GlobalSessionContext through a setter.</p> <p>Example:</p> <pre>@com.automationanywhere.commandsdk.annotations.GlobalSessionContext private GlobalSessionContext globalSessionContext;  public void setSessionMap(Map &lt; String, Object &gt; sessionMap) {     this.sessionMap = sessionMap; }  public void setGlobalSessionContext(com.automationanywhere.bot.service.GlobalSessionContext globalSessionContext) {     this.globalSessionContext = globalSessionContext; }</pre>
HasNext	<p>Method annotated with this annotation will participate in the execution of Iterator.</p> <p>This annotation can only be used when the BotCommand has commandType set as Iterator.</p> <p>Requires annotation Next to be present.</p> <p>Exactly one method needs to be annotated when BotCommand annotation is present on the type. Failure to do so will result in compilation error.</p>
Idx	Makes the annotated element part of hierarchy utilized for code and resource generation. In other words without this annotation no BotCommand related element annotations is processed.

Annotation	Description
Idx.Option	<p>An option represents the elements that would play in the hierarchy, but lend the values to the parents.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>• RADIO</li> </ul> <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 = Data Type.STRING) @Inject private String delayType;</pre> <ul style="list-style-type: none"> <li>• SELECT</li> </ul> <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 = "IE")) })</pre>

Annotation	Description
	<pre>CHROME")) } ) @Pkg(label = "[[LaunchWebsite.browser.label] ]", default_value = "DEFAULT", default_value_type = DataType.STRING) @NotEmptyStringbrowser)</pre>
Inject	Makes an element eligible for injection into the annotated type's 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 <code>Idx</code> .
Next	<p>Method annotated with this annotation will participate in the execution of Iterator.</p> <p>This annotation can only be used when the BotCommand has <code>commandType</code> set as <code>Iterator</code>.</p> <p>Requires annotation <code>HasNext</code> to be present.</p> <p>Exactly one method needs to be annotated when <code>BotCommand</code> annotation is present on the type. Failure to do so will result in compilation error.</p>
Pkg	Makes an element participate in creation of <code>package.json</code> . This annotation is ignored when <code>Idx</code> is not present.

Related concepts

[Annotations](#)

## Validation annotations

Validates annotated strings and values used in your 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 ends with the supported extension type.

Annotation	Description
GreaterThan	Validates that the annotated number variable value is always greater than given numeric value.
GreaterThanOrEqualTo	Validates that the annotated number variable value is always greater than or equal to given numeric value.
LessThan	Validates that the annotated number variable value is always less than given numeric value.
LessThanOrEqualTo	Validates that the annotated number variable value is always less than or equal to given numeric value.
LocalFile	Can only accept local paths and no file expression.
MatchesRegex	Validates the annotated String value matches the for given regular expression.
NotEmpty	Validates and throws exception when the annotated variable value is null. <pre>@Execute public Value&lt;Double&gt;length(@Idx(index="1", type=TEXT) @Pkg(label="Source string") @NotEmpty St ring sourceString) {}</pre>
NotEquals	Validates that the given String is not be equal to annotated String variable.
NotMatchesRegex	Validates the annotated String value does not match the for given regular expression.
NumberInteger	Ensures the UI accepts only integers 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 that must match
VariableType	The variable type that must match
VariableUserDefined	Can only choose user-defined a variable.

## Related concepts

[Annotations](#)

## 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](#)

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](#)

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](#)

Compile the demo Java code provided with this software development kit.

#### Step 3 [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.

#### Step 4 [Create a demo bot with the demo package](#)

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](#)

Modify and compile the Java code used to create a package to fix issues and create new functionality.

#### Step 6 [Upload new demo package](#)

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](#)

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).

### Prerequisites

Complete all the steps for project setup detailed in [Setting up the Java project](#).

This task shows you how to update the appropriate build and workflow files.

### Procedure

1. Open the project "A2019DemoPakcage" that you created in [Setting up the Java project](#). 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": "A2019DemoPackageFirst nameLastname",   "label": "A2019DemoPackageFirst nameLastname",   "description": "A2019DemoPackageFirst nameLastname",   "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.

## Next steps

After you have setup the build files, you need to compile the demo Java code, [Compile a demo JAR file from the command line](#).

# 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.

## Prerequisites

Before starting this task complete the steps in [Update related workflow and build files](#).

Build a package file using a Gradle project in the Eclipse IDE.

## Procedure

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).

## Next steps

To add your custom package to your Enterprise Control Room follow the instructions in [Add packages to the Enterprise Control Room](#).

Related concepts

[Build and test a demo package and bot](#)

## Compile a demo JAR file from the command line

Compile the demo Java code provided with this software development kit.

### Prerequisites

Before starting this task complete the steps in [Update related workflow and build files](#).

## Procedure

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.automationanywh
ere.botcommand.demo.Concatenate'

Note: Starting hierarchy discovery for 'com.automationanywhere.botcommand.
demo.Uppercase'

Note: Starting non-hierarchical element discovery for 'com.automationanywh
```

```

ere.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\.

## Next steps

To add your custom package to your Enterprise Control Room follow the instructions in [Add packages to the Enterprise Control Room](#).

Related concepts

[Build and test a demo package and bot](#)

# 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.

## Prerequisites

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.

## Procedure

1. Navigate to Bots > Packages.
2. Click Add package.
3. Browse to the location of the package to add.  
Packages are Java Archive (JAR) files that contain actions used to create bots.
4. Select the package to add, and click Upload package.
5. On the Bots > Packages > Confirm package page, choose any of the following options:

Option	Description
Reject	Stops the upload process.

Option	Description
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.

## Next steps

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](#)

## Create a demo bot with the demo package

Create a bot using the demo package to verify the actions that were created.

### Prerequisites

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](#)

### Procedure

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.

## Next steps

The task, [Change the Java file used to create the package JAR file](#), 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.

## Prerequisites

## Procedure

1. Open the project "A2019DemoPakcage."
2. From inside the project, open src/main/java/com.automationanywhere.botcommand.samples.commands/basic/Uppercase .
3. 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).toLowerCase() + sourceString     .substring(1));</pre>

4. Save the changes and re-compile the package.

## Next steps

You can now upload the changed package to the Enterprise Control Room. [Upload new demo package](#)

---

Related tasks

[Upload new demo package](#)

## Upload new demo package

Package management allows you to upload package updates. The new package has the same name, but a different version number.

### Prerequisites

You need AAE\_Basic permissions to create and edit bots.

### Procedure

1. From the Bots > Packages page, click the Add package icon.
2. Browse to the location of the package to add.  
Packages are Java Archive (JAR) files that contain actions used to create bots.
3. Select the package to add, and click Upload package.
4. On the Bots > Packages > Confirm package page, click Accept, enable and set as default.

### Next steps

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](#) task.

## Update the demo bot with the updated package

Update bots to use specific package versions.

### Prerequisites

- Access to the bot created in the task [Create a demo bot with the demo package](#).
- AAE\_Basic permission.

### Procedure

1. Go to Bots > My bots and double-click MyDemoBot1, the demo bot you created in an earlier task.
2. Click the vertical ellipses in the upper right corner and click Packages.
3. Expand the row for the package A2019DemoPackageFirstnameLastname.
4. 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](#)

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](#)

Use the compiled JAR file and upload it to the Enterprise Control Room.

### [3. Create a bot to test the custom package](#)

Use Enterprise A2019 actions to create a bot to test the custom package.

#### Related tasks

[Create and build a custom package using IntelliJ](#)

[Add custom package to your Enterprise Control Room](#)

[Create a bot to test the custom package](#)

## 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.

### Prerequisites

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](#)

## Procedure

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  
        ER, 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 th  
e 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.toStr  
ing() + "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.automationanyhwere.botcommand, and delete the samples.commands package. Additionally, delete the samples package.
10. Update the CommandPkg annotation.
- Download ruler\_icon.svg from [github](#) and right-click the image and save the image as ruler\_icon.svg.
  - Download iconwhite.svg from [github](#), right-click the image and save the image iconwhite.svg.
  - 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.
- In the Name field, enter `test\java`, or select the `test\java` suggestion from the Gradle Source Sets.
  - Right-click the java directory and select New > Package.

c) Enter the name for the newly created package:

```
com.automationanywhere.botcommand.metictoimperial.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\MetricToImper
ial"
```

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.

## Next steps

[Add custom package to your Enterprise Control Room](#)

## 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.

## Prerequisites

- Complete the steps in [Create and build a custom package using IntelliJ](#).
- Ensure you have the following:

- Access to the Enterprise Control Room.
- Credentials with AAE\_Bot Store Publisher permission.

## Procedure

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.

## Next steps

[Create a bot to test the custom package](#)

Related concepts

[Build and test a custom package](#)

Related tasks

[Add custom package to your Enterprise Control Room](#)

[Create a bot to 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.

## Prerequisites

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.

## Procedure

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.
- In the Enter a number field, enter F2 and select `nInchesOutput`.
  - In the Enter number of digits after decimal field, enter `5`
  - In the Assign the output to variable field, select prompt-assignment - String from the drop-down list.
  - 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](#)

#### Related tasks

[Create and build a custom package using IntelliJ](#)

[Add custom package to your Enterprise Control Room](#)

## 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 A2019.16

Feature	Description
Runtime library updates	Bundled latest bot run-time libraries.
Added NoLogging	Added NoLogging support.

### [A2019-package-sdk-2.0.5](#)

## Enhancements A2019.15

Feature	Description
Runtime library updates	Bundled latest bot run-time libraries.

### [A2019-package-sdk-2.0.4](#)

## Enhancements A2019.14

Feature	Description
Desktop operations	Added desktop operations support.
Samples for actions in 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
Run-time library updates	Bundled latest bot run-time 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
Run-time libraries	Added the latest run-time 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
Run-time libraries	This package contains the latest run-time 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.
Run-time libraries	Bundled latest bot run-time 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 run-time libraries	Bundled latest bot run-time 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 run-time libraries	Bundled latest bot run-time 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 run-time libraries	The A2019.07 bot run-time libraries are bundled in the SDK package.
CREIDENTIAL 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

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](#).

## Procedure

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": [ ] }.
```

## Next steps

[Build a bot to parse JSON response using JavaScript](#)

[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.

## Prerequisites

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](#)

- Access to the Enterprise Control Room or Community Control Room
- Your workstation is a registered device in the Enterprise Control Room.

## Procedure

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 `$sURI$` and click Yes, insert.
  - b) In the Authentication Mode drop-down list, select No Authentication.
  - c) Click Header > Custom Headers > (Add):
    - a) In the Name field, enter  
`Ocp-Apim-Subscription-Key`

- b) In the Value field, select \$sSubscriptionKey\$ 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. Click Apply.
- 10. Create a new sOutput variable of Type > String.
- 11. 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.
  - d) Click Apply.
- 12. Create a new lParseOutput variable of Type > List and Subtype > String.
- 13. Create a new sSentimentValue variable of Type > String.
- 14. 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.
  - d) Click Apply.
- 15. 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;}
```

- c) Click Apply.
- 16. 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 IParseOutput - List.
  - d) In the Assign the output to variable drop-down list, select sSentimentValue - String.
  - e) Click Apply.
17. From the Actions pane, drag Message box to your bot.
- a) In the Enter the message to display field, enter:  
**Sentiment score: \$sSentimentValue\$**
  - b) Click Apply.
18. 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

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

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.

### Prerequisites

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](#)

## Procedure

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\_App page 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.

## Next steps

[Build a bot using REST web services and String actions](#)

[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.

## Prerequisites

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](#)
- Access to the Enterprise Control Room or Community Control Room
- Your workstation as a registered device in the Enterprise Control Room.

## Procedure

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.
  - e) Click Apply.
13. From the Actions pane, drag Message box to the bot flow. In the Enter the message to display field, enter  
`$dResponse{Body}$`  
Click Apply.
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.
  - d) Click Apply.

15. From the Actions pane, drag Message box to the bot flow. In the Enter the message to display field, enter  
**\$sExtractedValue\$**  
. Click Apply.

16. From the Actions pane, select REST Web Services > Post method.
- In the URI field, enter `https://ap17.salesforce.com/services/data/v36.0/sobjects/Account`. Replace `ap17` with your Salesforce instance number.
  - In the Authentication Mode drop-down list, select No Authentication.
  - Click Header > Custom Headers > (Add):
    - In the Name field, enter **Authorization**
    - In the Value field, enter **Bearer \$sExtractedValue\$**
  - In the Content type drop-down list, select JSON (application/json).
  - In Custom Parameters, enter the following code:

```
{
  "Name" : "Text passed through A2019 REST API"
}
```

- In the Assign the output to a variable drop-down list, select `dOutput -Dictionary of Strings`.
  - Click Apply.
17. From the Actions pane, drag Message box. In the Enter the message to display field, enter  
**\$dOutput{Body}\$**  
. Click Apply.
18. From the Action pane, select String > Extract text.
- In the Source string field, enter **\$dOutput{Body}\$**
  - 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.
  - In the Assign the output to a variable drop-down list, create a new `sURLValue` by clicking the plus sign, Type > String.
  - Click Create & Select.
  - Click Apply.
19. From the Actions pane, drag Message box. In the Enter the message to display field, enter  
**\$sURLValue\$**  
. Click Apply.

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.

### Prerequisites

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.

### Procedure

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.
  - d) Click Apply.
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.  
 c) Click Apply.
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'] + ", " + respo
nse_body[itemCount]['location']['state']

```

- c) In the Python runtime version field, retain the default value as 3.

- d) Click Apply.
9. From the Actions pane, click Python script > Execute function.
- In the Python session field, retain Default.
  - In the Enter the name of function to be executed field, enter  
`get_node_count`
  - In the Arguments to the function drop-down list, select dResponseBody - String.
  - In the Assign the output to a variable drop-down list, select sTotalUserCount - String.
  - Click Apply.
10. From the Actions pane, click Dictionary > Put.
- In the Dictionary variable field, select dRetrieveValue -Dictionary.
  - In the Associate to this key field, enter  
`response`
  - In the New value drop-down list, select dResponseBody - String.
  - In the Assign previous value to a variable drop-down list, select prompt-assignment - String.
  - Click Apply.
11. From the Actions pane, click String > To number.
- In the Enter the string field, enter  
`sTotalUserCount`
  - In the Assign the output to a variable drop-down list, select nTotalUserCount - Number.
  - Click Apply.
12. From the Actions pane, click Loop > Loop.
- In the Loop Type > Iterator, select For n times from the drop-down list.
  - In the times field, enter  
`$nTotalUserCount$`
  - In the Assign the current value to a variable drop-down list, select nCurrentUser - Number.
  - Click Apply.
13. From the Actions pane, click Number, select Decrement and place it inside the Loop action.
- In the Enter number field, enter  
`$nCurrentUser$`
  - In the Enter decrement value field, enter  
`1`
  - In the Assign output to a variable drop-down list, select nCurrentUser - Number.
  - Click Apply.
14. From the Actions pane, click Number, select To string and place it inside of the Loop action, below Number > Decrement.
- In the Enter a number field, enter  
`$nCurrentUser$`
  - In the Enter number of digits after decimal field, enter  
`0`
  - In the Assign output to a variable drop-down list, select sCurrentUser - String.
  - Click Apply.
15. From the Actiond pane, click Dictionary > Put and place it inside of the Loop action.
- In the Dictionary variable field, select dRetrieveValue -Dictionary.
  - 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.  
 e) Click Apply.
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.  
 e) Click Apply.
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.  
 e) Click Apply.
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`
- c) Click Apply.
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.  
 b) Click Apply.
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.

### Prerequisites

Ensure you have the following to build the bot:

- Basic understanding of JavaScript programming language.
- Basic experience with creating Automation Anywhere bots.

## Procedure

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.
- d) Click Apply.

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.
- d) Click Apply.

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.
- e) Click Apply.

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 lInputList - List.

- c) Click Apply.

11. From the Actions pane, click Message box:

- a) In the Enter the message to display field, enter

\$sOutput\$

- b) Click Apply.
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 these requirements, your submission will be rejected and will not be published on the Bot Store page.

- **[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.

- **[Building reusable packages](#)**

Review the guidelines to understand how to build packages for reusability.

## 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 these requirements, your submission will be rejected and will not be published on the Bot Store page.

Note: Ensure you have Enterprise A2019.11 or later for the Bot Store submission.

| Item number | Item                                                          | Submission requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Register as a vendor (required for the first submission only) | <p>Every developer or an organization that posts bots on the Bot Store must register as a vendor.</p> <p>Use the Bot Store partner profile page to register using the <a href="#">Bot Store Vendor Profile page</a>. In this page, enter the details about the organization as well as the logos that can be used with the bots.</p> <p>This is a one-time process that has to be set up as a vendor. Bots submitted after this initial vendor registration process can all be linked to the existing registered vendor.</p> |
| 2           | Use the template for Readme file                              | Use the provided Readme template for submitting a bot or a package to the Bot Store: <a href="#">Bot Store template</a> . The Readme file template contains the necessary details on how to use the template.                                                                                                                                                                                                                                                                                                                |

| Item number | Item                             | Submission requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | content and format               | <p>The Readme file must include all information that is required for your bot to be submitted to the Bot Store:</p> <ul style="list-style-type: none"> <li>• Describe all included files and the purpose of each file.</li> <li>• List the required inputs, outputs, and provide examples.</li> <li>• If required, highlight any bot or package dependencies, such as, API keys, xls or csv files.</li> <li>• For package: List actions and their purpose. Include the expected inputs and outputs.</li> </ul> <p>Submit the final Readme file in the PDF format. Do not include it as your bot dependency when uploading bots from the Enterprise Control Room.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 3           | Follow file and folder structure | <p>Once imported, the Bot Store template is automatically installed to a directory named <code>BotName - VendorName</code> in the root of the Private Bot Store workspace of your Enterprise Control Room. Rename the folder to reflect the <code>Vendor Name</code> that you registered with in Step 1 of this checklist as well as the <code>Bot Name</code> for your submission. Also, rename the bot installed from the template as <code>BotShell</code>. The template contains basic error handling, logging, and snapshot files with customizable root logging location for maintaining older log files.</p> <ul style="list-style-type: none"> <li>• All bot files and their dependencies must be contained within a single parent folder.</li> <li>• Include all the dependencies, such as subfolders, subtasks, DLLs, scripts, and Python files.</li> <li>• For package development, include a sample bot that demonstrates the package use. Use the same naming structure as used for the bot submission.</li> <li>• You can modify files and folders within the parent folder. When the bot and all its dependencies are ready for the submission to the Bot Store, it must be checked into the Public Bot Store workspace of your Enterprise Control Room.</li> </ul> <p>Naming example:</p> <p>If in step 1 of this checklist, you registered as a vendor named <code>Bot Factory</code> and named your bot as <code>Currency Converter</code> than your bot folder name must be <code>Currency Converter - Bot Factory</code>.</p> |
| 4           | Include images and videos        | <p>As part of the bot or package submission process, one main image or a video and three to five additional images are required.</p> <ul style="list-style-type: none"> <li>• Videos can demonstrate the full capabilities of the bot so that potential customers will know how it can be applied.</li> <li>• Images help customers to decide whether or not to download the bot or package.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 5           | Include a demo bot               | As part of the bot submission process, when submitting a bot or a package include a demo bot to show:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

| Item number | Item                          | Submission requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             |                               | <ul style="list-style-type: none"> <li>• how your bot or subtask can be used.</li> <li>• how the actions within your package can be invoked.</li> </ul> <p>If your bot is designed to call a subtask from another bot, include a sample master bot that demonstrates setting values, invoking a subtask, and handling the subtask response.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 6           | Follow the submission process | <p>The submission process for the Enterprise A2019 bot or package starts with the Enterprise Control Room:</p> <ol style="list-style-type: none"> <li>1. Check in your bots and all dependencies into the Bot Store Public workspace of on your Enterprise Control Room. In the My bots page, move your mouse over the Action toolbar, and click Submit to Bot Store.</li> <li>2. 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 the Bot Store.</li> <li>3. After bots or packages have been submitted, navigate to the Bot Store &gt; My Submissions to complete the submission form.</li> </ol> |

## 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](#)

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 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.

Related tasks

[Using Loop action](#)

Related reference

[User-defined variables](#)

[Application package](#)

[Error handler package](#)

[Step package](#)

[Prompt package](#)

[Message box package](#)

## 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 (ArithmetricException e) {
    //Throw custom message on Atithmetic Exception
    throw new BotCommandException("Math Operation Error with " + I
nteger.toString(myIntArray[0]) + " and " + Integer.toString(myIntA
rray[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 expand their bot capabilities.
- Always provide sample bots with descriptions to help your package consumers with the knowledge they require to understand its proper use.

Related reference

[Building reusable bots](#)

## 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.

- [Debugger features](#)

The Automation Anywhere Debugger provides tools to help identify and fix issues during bot development.

- [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.

## 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.<br><br>Information in this file is typically used by a Bot Creator.                                                                                                                                             |
| 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.<br><br>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.                                                                                                                                                                                       |

| Mode  | Level           | Description                                                                             |
|-------|-----------------|-----------------------------------------------------------------------------------------|
| 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

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This collection of topics will guide you in configuring the devices and users that access Automation Anywhere.

Learn more about these topics:

- [Activity](#)  
Monitor, pause, stop, and resume ongoing automation activities.
- [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.
- [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.
- [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.
- [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.
- [Administration](#)  
Enterprise Control Room administrators manage settings related to the database, Credential Vault, users, roles, action packages, licensing, and more.
- [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.
- [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.
- [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.
- [Enterprise Control Room APIs](#)  
The Automation Anywhere Enterprise Control Room provides various public APIs that allow you to customize your business automation for third-party applications.

Related tasks

[Schedule a bot](#)

[Set up locker and assign credentials](#)

[Create a role](#)

[Create user](#)

[Set user device credentials](#)

[Edit profile](#)

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[Installing additional licenses](#)

## Activity

Monitor, pause, stop, and resume ongoing automation activities.

### 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.

- [Using event triggers](#)

All the bots that have a preset or predefined event as a trigger are listed under the Event triggers tab.

- [Historical activity](#)

You can search, edit, and deploy previously created bots.

- [Audit Log](#)

View logs and details to record user activities.

## 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](#)

You can schedule a bot to run at a specific time.

- [Edit a scheduled activity](#)

Make changes to a schedule so that the automation is not skipped.

- [Delete a scheduled activity](#)

Delete a scheduled activity.

## Schedule a bot

You can schedule a bot to run at a specific time.

## Prerequisites

Create a bot.

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 permission.

## Procedure

1. Navigate to Activity > Scheduled
2. In the Scheduled activity page, click Run bot and then select schedule bot.
3. Enter the Name and optionally add a Description for the schedule.
4. Add schedule details from the Schedule tab.

Choose an option to schedule the bot:

- Run once: To run the bot on a given day at a specified time, enter the Start date, Start time, and Time zone.

The default value of the Start date is the current day. The default Start time is a roundup to the next half-hour.

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.

- Run repeatedly: To schedule a bot to run at specific time on a given day, set the Start date, End date, Start time, and Time zone values.

The default value of the Start date is the current day. The default Start time is a roundup to the next half-hour. For example, if the current time is 13:43 hours, the default time 14:00 hours is displayed. The default value of the End date field is blank. The default Time zone is PDT (UTC-7:00) Los Angeles, America.

5. Select the Bots folder within TaskBots.

The available bots are displayed with the option to select them. Any Input values and the bot dependencies are shown.

6. Select a Bot Runner user from the Available bot runners list in the Device/Run As tab.

7. Click the right arrow.

The device is added to the Selected devices, which displays the list of connected and disconnected devices to the Enterprise Control Room.

Note: If you want to enable a device, it must be connected to the Control Room. Also, if a device does not appear in the list, ensure that an active Bot Runner session is running on the device.

8. Click Device pools

Select the desired pool from the list of device pools. An option is available to override the configured default device.

9. 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](#)

Related tasks

[Edit a scheduled activity](#)

[Delete a scheduled activity](#)

## Edit a scheduled activity

Make changes to a schedule so that the automation is not skipped.

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.

## Procedure

1. Hover over the Actions icon of an item in the Activity table.
2. Click Edit.  
The Edit scheduled bot page appears.
3. Make changes to the schedule details, bots, and devices, as required.  
Note: The system redeloys the bots and dependencies only if there are updates to the bots or its dependent files.
4. Click Schedule bot.

Related tasks

[Schedule a bot](#)

[Delete a scheduled activity](#)

## Delete a scheduled activity

Delete a scheduled activity.

To delete a scheduled activity:

## Procedure

1. Hover over the Actions icon of an item in the Activity table.
2. Click Delete.  
A delete confirmation message appears.
3. Click Yes, delete to delete the scheduled activity.

Related tasks

[Schedule a bot](#)

[Edit a scheduled activity](#)

## 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 cannot delete any event triggers.                                                                                                                                                                                                         |
| Manage event triggers | <ul style="list-style-type: none"> <li>Can delete an existing event trigger.</li> <li>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.</li> </ul> |

## Supported actions

- View the trigger status, bot path, user name, role, and modification details.
- Use the Search option for the above parameters.
- Copy, cut, or delete the selected event trigger.
- Enable or disable the selected event trigger.
- [Adding event triggers](#)  
Enterprise Control Room users with Manage event triggers role can add event triggers in Enterprise A2019.
- [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.

### Related concepts

[Adding a trigger to run a bot](#)

## Adding event triggers

Enterprise Control Room users with Manage event triggers role can add event triggers in Enterprise A2019.

### Procedure

1. Click Bots > My bots.
2. Click Run bot > Run with event triggers.
3. In the Add event triggers page, select a TaskBot and use the right arrow to add it.
4. Click Next.
5. Select the role or user that must be associated with this bot, and use the right arrow to add it.
6. Click Add event trigger.

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.

## Prerequisites

Administrator must create a custom role with BOTS > View my bots > Run my bots permission and perform the following actions:

- Associate this role with a Bot Runner (attended) user.
- Enable access to a default device along with the device login credentials to this user.

### Roles

A user with the Bot Creator license creates a bot and checks it in. This bot is now available in the Public workspace. Enterprise Control Room administrator can then use the following procedure to add an event trigger:

## Procedure

1. From the public workspace, click Bots > My bots.
2. Click Run bot > Run with event triggers.  
A list of all the available bots is displayed.
3. Select the TaskBot and click the right arrow to add it.
4. Click Next.
5. In the Associate this bot with page, select one of the following to link the bot:
  - Roles: Select the custom role you have created.
  - Users: Select the Bot Runner (attended or unattended) user who is associated with this custom role.
6. Click Add event triggers.  
Event triggers page that lists all the bots with event triggers is displayed.

When the Bot Runner user logs in to Enterprise Control Room and performs the trigger event, the bot is deployed.

Note: A Bot Runner (attended) user must log in to 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.
- Bot listening is disabled (Event monitoring page).

## 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 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. | <p>Possible reasons for failure entry include:</p> <ul style="list-style-type: none"> <li>• Check if you have configured the Node manager on the corresponding device correctly.</li> <li>• Check for the app Automation Anywhere Bot Manager in Add Remove Programs or in Control Panel &gt; Uninstall a program. Try to reinstall by uninstalling and downloading the app again.</li> <li>• Try to reinstall by uninstalling and downloading the app again from Device Manager.</li> <li>• Ensure the device auto log in details are set correctly.</li> </ul> |
| Run bot Deployed   | The bot has started on the specified device.                                   | <p>Possible reasons for failure entry include:</p> <ul style="list-style-type: none"> <li>• Check if you have configured the Node manager on the corresponding device correctly.</li> <li>• Check for app Automation Anywhere Bot Manager in Add Remove Programs or in Control Panel &gt; Uninstall a program.</li> <li>• Try to reinstall by uninstalling and downloading the app again from Device Manager.</li> <li>• Ensure device auto log in details are set correctly.</li> </ul>                                                                         |
| Run bot finished   | Bot execution completed successfully.                                          | <p>Possible reasons for failure entry include:</p> <ul style="list-style-type: none"> <li>• Check for the bot execution progression in Activity In progress.</li> <li>• Check the code at the line where activity log has been paused for errors.</li> <li>• If it has paused at a message box, minimize all windows and check if the message box is in the background.</li> </ul>                                                                                                                                                                               |

| Audit log entry              | Success                                                                              | Failure                                     |
|------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------|
| 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.

- 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.

## 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.

- [About multi-user devices](#)

A multi-user device is any Windows terminal server device (Windows 2019, Windows 2016, Windows 2012, ) which enables multiple users to concurrently log in to a single device.

- [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.

Related tasks

[Install Bot agent and register device](#)

[Set user device credentials](#)

## About multi-user devices

A multi-user device is any Windows terminal server device (Windows 2019, Windows 2016, Windows 2012, ) 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.

- [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.

## 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.

When registering your device, you can register it as a multi-user device.

## Procedure

1. Log in to the Enterprise Control Room.
2. Go to Devices > My Devices.
3. Locate the device 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.
4. In the Edit device page, change the device type to Multiple users.
5. Define 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](#)

- At the device level.

## Devices

7. Edit the RDP settings for multiple user devices field.
8. Define the Port and the RDP session timeout value.  
Note: The default port is 3389 and session timeout value is 60.
9. Click Save changes.

### 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.

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.

### Procedure

1. Log in to the Enterprise Control Room.
2. Go to Devices > My Devices.
3. Locate the device, mouse over the actions menu (vertical ellipsis), and click Edit.
4. In the Edit device page, change the device type to Multiple users.  
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.
5. Enter the number of allowed concurrent sessions in the Concurrent sessions supported field.  
Most Microsoft Windows Server instances allow two simultaneous sessions by default. This can be increased based on your license.
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.

When you assign a Bot Runner to a device pool, you can no longer schedule or run ad hoc tasks or bots on it.

## 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.

Devices can belong to more than one device pool. 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.
- [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.
- [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.
- [Delete device pools](#)  
You can 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.

## Create device pools

Create a device pool with a unique name and add Unattended Bot Runners to the device pool.

## Prerequisites

- The Create device pools feature permission or the AAE\_Pool Admin role must be assigned to you.
- You can add only those Unattended Bot Runners that are not part of any other pool and are not associated with any role.
- 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.

By default, the creator of the pool is the device pool owner.

## Procedure

To create a device pool, do the following:

1. Go to Devices > My device pools page.
2. Click Create device pool on the top right of the My device pool page.  
Tip: If no device pools are available, click the create a device pool link in the My device pool page. The Create device pool page appears.
3. Enter a valid device pool name.  
For example, you can create a Finance Automation pool that can run all finance-related automations on Unattended Bot Runners from the finance department.
4. Select Unattended Bot Runners from the list.  
This list shows only the devices with Unattended Bot Runner licenses.  
Restriction: Unattended Bot Runners that are a part of other device pools are disabled for selection.
5. Add the Unattended Bot Runner(s) to the Selected devices list.  
Tip: Click the left arrow button to remove the Bot Runner from the Selected devices list.
6. Subsequently, grant permissions to view, edit, and delete the device pool to the other Enterprise Control Room users:
  - a) Click Next to select the Device Pool Owners.
  - b) Select user(s) from the Available users list.  
Tip: Search the list of users based on their Username, First name, or Last name.
  - c) Click the right arrow button  
The user appears in the Selected users list.  
Note: The device pool creator is listed as the default owner of the pool.
  - d) Click the left arrow button to remove the user from the Selected users list.  
Restriction: You cannot remove the device pool creator.
7. Click Next to select the Device Pool Consumers.  
Do this step so that the device pool consumers can view the device pool when they run the automation for the bot with a queue by following the next set of steps.
  - a) Select a Role from the Available roles list.  
Tip: Search for a role name.
  - b) Click the right arrow button.  
The user appears in the Selected roles list.

Tip: Click the left arrow button to remove the user from the Selected roles list.

#### 8. Click Create Device Pool.

The device pools for which you have consumer privileges are listed in the My Device Pools page.

## Next steps

[View device pool details](#)

Related concepts

[Run bot with queue](#)

### 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.

Use the Device pool details page to view automations that are scheduled to run with or without workload.

## Procedure

To view device pool details:

1. Go to Devices > My Device Pools

2. Locate the device pool to view, mouse over the View action icon and click.

The Device pool details page appears. The Scheduled Automations tab is selected by default. It lists the automations that are created using Run bot now or Schedule bot (upcoming schedules) on that device pool.

The second tab, Run with Queue Automations lists the automations that are scheduled to run for Workload using the option Run bot with queue.

The page also has the device pool details such as the Name, Description, Status, and General details. It allows you to view additional details of the device pool such as Automations, Devices, Owners, and Consumers.

3. Select each tab to view its details.

#### 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](#)

## 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](#)

## 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.

## Next steps

[Edit device pools](#), or [Run bot with queue](#).

Related tasks

[Create device pools](#)

[Delete device pools](#)

## 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.

## Procedure

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](#)

[Schedule a bot](#)

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        | <p>Shows the priority number allotted to that queue.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• You can also view the priority list in ascending or descending order by clicking the ordering arrows in the Priority header.</li> </ul> |
| 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.                                                                                                                                                                                                                                                                                                                                                                                          |

| Table item    | Description                                                                                     |
|---------------|-------------------------------------------------------------------------------------------------|
| 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](#)

[Delete device pools](#)

[View device pool details](#)

## Delete device pools

You can 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.

You can choose to delete your device pools in either of two ways:

- Delete one device pool
- Delete multiple or all device pools

## Procedure

1. Delete one device pool:
  - a) Go to Devices > My Device Pools.
  - b) Locate the device pool to delete, mouse over the Delete action icon and click.
  - c) Confirm or cancel as required.
2. Delete multiple or all device pools
  - a) Select the device pools to delete or select all device pools by selecting the Select All check box in the header.
  - b) Click Delete given at the top of the device pools table.
  - c) Confirm or cancel as required.

If the device pool is being used for workload automation, you will not be allowed to delete it.

Based on your selection, the devices are deleted.

#### Related tasks

[View device pool details](#)

[Create device pools](#)

# 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           | <ul style="list-style-type: none"> <li>• AAE_Admin</li> <li>• AAE_Queue_Admin</li> <li>• AAE_Pool_Admin</li> </ul>                                                                     |
| Activity permissions | <ul style="list-style-type: none"> <li>• View my in progress activity</li> <li>• View my scheduled bots</li> <li>• Schedule my bots to run</li> </ul>                                  |
| Device permissions   | <ul style="list-style-type: none"> <li>• View and manage my Bot Creator, Bot Runner, and device pools</li> <li>• Create device pools</li> <li>• Administer all device pools</li> </ul> |
| Bots permissions     | <ul style="list-style-type: none"> <li>• View my bots</li> <li>• Run my bots</li> </ul>                                                                                                |
| Workload permissions | <ul style="list-style-type: none"> <li>• View and manage my queues</li> <li>• Create queues</li> <li>• Administer all queues</li> </ul>                                                |

Watch the following video on how to use the Workload feature in the Enterprise Control Room:

### Using 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.

- [Run bot with queue](#)

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

- [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.

- [Manage Work Items](#)

Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

#### Related tasks

[Attach work item template to TaskBot](#)

[Use Work Item variables](#)

#### Related reference

[Workload package](#)

## 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](#)

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](#)

Add queue owners who can create, edit, and view queues. The queue creator is the default queue owner and is able to add other Enterprise Control Room users as queue owners, if required.

#### [Add participants to queue](#)

Add queue participants from different roles defined in the Enterprise Control Room. This is an optional step.

#### [Add consumers of queues](#)

Add queue consumers from different roles defined in the Enterprise Control Room. This is an optional step.

#### [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.

#### [Insert Work Items](#)

Add Work Items from an Excel or CSV file to the queue after you define the structure.

#### Related concepts

[Run bot with queue](#)

#### Related tasks

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[Attach work item template to TaskBot](#)

## 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.

## Prerequisites

Create a queue by providing details such as the queue name, queue owners, participants, consumers, and work item structure. A summary of these details is available in the tab on the left side of the Create queue page. Open any tab to edit the details.

## Procedure

1. Go to Workload > Queues.
2. Click Create queue.  
The Create queue page appears.
3. Configure the following General Settings:
  - a) Queue Name: Enter a name for the queue that reflects its purpose.  
For example, Payroll Queue for work items that are designed to manage a payroll system.
  - b) Optional: Description: Enter a description that reflects what the queue will achieve.  
For example, the Payroll Queue will process automation that are designed to manage the payroll system.
  - c) Reactivation Threshold: Set the threshold to resume queue processing.

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.

Default threshold is 1 (one).

d) Optional: Time required for a person to complete one work item: Select the average time that a person would need to complete one work item in seconds, minutes, hours, or days.

4. Click Next to add the queue owners.

### [Add queue owners](#)

Note: You can choose to Create draft of queue and add the remaining information later.

## Related tasks

[Edit queues](#)

[Delete Queues](#)

## Add queue owners

Add queue owners who can create, edit, and view queues. The queue creator is the default queue owner and is able to add other Enterprise Control Room users as queue owners, if required.

## Prerequisites

Queue owners are allowed to edit the queue and add new work items to the queue.

## Procedure

1. Select user(s) from the Available Users list in the Owners tab.
2. Click the left arrow key.  
The users are added as Queue Owners in the Selected users list.
3. Click Next to add the queue participants.  
[Add queue participants](#)

### Add participants to queue

Add queue participants from different roles defined in the Enterprise Control Room. This is an optional step.

## Prerequisites

Participant roles can add new work items and view the queue. However, they are not allowed to edit other queue properties.

## Procedure

1. Select role(s) from the Available Roles list in the Participants tab.
2. Click the right arrow button.  
The roles are added as Participants in the Selected roles list.
3. Click Next to add the queue consumers.  
[Add consumers of queues](#)

### Add consumers of queues

Add queue consumers from different roles defined in the Enterprise Control Room. This is an optional step.

## Prerequisites

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.

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.

## Procedure

1. Select role(s) from the Available Roles list in the Consumers tab.
2. Click the right arrow button.  
The roles are added as Consumers in the Selected roles list.
3. Click Next to define the Work Item structure.

[Define Work Item structure](#)

### 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.

## Procedure

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:

- c) 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](#)

- d) 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 RoomWork Item. However, the same is not applicable to a csv file.

- e) 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](#)

- 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](#)

Related reference

[Work item status and actions](#)

### Insert Work Items

Add Work Items from an Excel or CSV file to the queue after you define the structure.

### Prerequisites

Tip: You can also add Work Items later by editing the queue.

#### [Edit queues](#)

### Procedure

1. Click Browse to select an Excel or CSV file.

The file is added as a Work Item in 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.

## 2. Click Create Queue.

The queue is successfully added at the top of the Queues list. You can choose to apply the column sorting to view as required.

## Next steps

- Now that you have created a queue, it is now ready for deployment from a bot.

### [Run bot with queue](#)

- Manage Work Items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

### [Manage Work Items](#)

## 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           | <ul style="list-style-type: none"> <li>AAE_Admin</li> <li>AAE_Queue_Admin</li> <li>AAE_Pool_Admin</li> </ul>                                                                     |
| Activity permissions | <ul style="list-style-type: none"> <li>View my in progress activity</li> <li>View my scheduled bots</li> <li>Schedule my bots to run</li> </ul>                                  |
| Device permissions   | <ul style="list-style-type: none"> <li>View and manage my Bot Creator, Bot Runner, and device pools</li> <li>Create device pools</li> <li>Administer all device pools</li> </ul> |
| Bots permissions     | <ul style="list-style-type: none"> <li>View my bots</li> <li>Run my bots</li> </ul>                                                                                              |

| Feature type         | Privileges                                                                                                                              |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Workload permissions | <ul style="list-style-type: none"> <li>• View and manage my queues</li> <li>• Create queues</li> <li>• Administer all queues</li> </ul> |

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.

- [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.
- [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.

Related tasks

[View automation of a queue](#)

### 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.

### Procedure

1. Go 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](#)  
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](#)

The TaskBot also has an icon that indicates a missing work item template.

Related reference

[Bot dependencies](#)

#### 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.

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.

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.

Tip: Use Search to quickly find the required queue, Bot Runner, and device pool.

Note: For Workload management automations to work, the device login credentials must be the same for all devices available in a device pool.

#### Procedure

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](#)

Use the View queues details page to view the details of a particular queue.

#### [Edit queues](#)

Edit a queue using two methods - from the Queues list, or from the View queue page.

#### [Delete Queues](#)

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.

Related reference

#### [Actions allowed on view queue page](#)

### View queue details

Use the View queues details page to view the details of a particular queue.

### Prerequisites

Permissions required:

1. Queue Owner or Queue Participant or Consumer rights
2. View and manage my Queues feature permission

### Procedure

1. Go to Workload > Queues
2. Hover over a queue to view
3. Click the Actions menu (vertical ellipsis).
4. Click the view details button.

This launches the View queues page which shows details of the queue in two sections:

- a) Name, Description, My access status, and queue Status such as:
  - b) New when the work item is added to the queue recently.
  - c) On hold when the work item is deferred from processing by a Queue owner, participant, or consumer.
  - d) Failed when the work item processing failed on an unattended bot.
  - e) Completed when the work item is successfully processed by a Bot Runner or marked Completed by a queue owner, participant or consumer.
  - f) Data error when there is an error in loading data from the file.
  - g) Active when the work item is currently being processed or staged for processing.

- h) Ready to run when the work item is successfully processed for execution does not have any data errors and can be staged for processing.
  - i) Queue contents in different tabs such as:
    - a) 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.
    - b) General: View the Reactivation Threshold and Time required to complete one work item.
    - c) Owners: View the user names of queue owners who can edit the queue and add new work items.
    - d) Participants: View the user names of queue participants who can add new work items and view the queue.
    - e) 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.
    - f) 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.
- j) dfdf

## Next steps

[View automation of a queue](#)

Related concepts

[Manage Work Items](#)

Related tasks

[Create queues](#)

[Edit queues](#)

[Delete Queues](#)

Related reference

[Actions allowed on view queue page](#)

## Edit queues

Edit a queue using two methods - from the Queues list, or from the View queue page.

## Prerequisites

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

## Procedure

1. Go to Workload > Queues
2. Edit a queue from the View queue page or from the Queues list
3. Hover over a queue to edit
4. Click the Actions menu (vertical ellipsis).

5. Click the View button  
The View queue page is launched.
6. Click either of the following to launch the Edit Queue page
  - edit this queue link
  - Edit button
7. 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.
8. 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.
9. Click Browse
10. Select the file to upload  
Note: You can upload only an Excel or CSV file.
11. Click Save changes  
If you provide a duplicate name, an error is displayed.
12. Edit the name and save the changes made to the queue  
An edit successful message appears.

## Next steps

[Delete Queues](#)

Related concepts

[Manage Work Items](#)

Related tasks

[Create queues](#)

Related reference

[Actions allowed on view queue page](#)

## Delete Queues

Delete selected or all queues.

## Prerequisites

Permissions required:

1. AAE\_Queue Admin role
2. Queue Owner rights

## Procedure

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](#)

[View automation of a queue](#)

[Edit queues](#)

#### 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:<br>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 |
| 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](#)

## 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.

## Prerequisites

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.

## Procedure

1. Go 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.

## Next steps

[Edit queues](#)

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Related tasks

[View queue details](#)

[Delete 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.

- [Edit work items](#)

Use the Queues page or the Work item page to edit the work items of a queue.

- [Delete work items](#)

Delete work items one at a time or in bulk in the View work item page.

- [Work item status and actions](#)

Based on the Work Item status, you can do only certain actions on a Work Item.

### View work items

View work items with a status of Completed, Unsuccessful, On hold, Active, or Data Error in the View work item page.

From the Workload > Queues page, you can:

1. Perform the following actions on either one queue or multiple queues:
  - 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.
2. Select a queue to View, Edit, or Delete a queue.

### Procedure

1. Hover over a work item.
2. Click the Actions menu (vertical ellipsis).
3. Click View.

The View work item page appears. The page provides details of the work item in four sections: Work Item Details, Work Item, Automation, and Work Item Results.

4. In the Work Item Details section, view the Status, Status Details, Start time and End time, and Queue Name.

#### [Actions allowed on view queue page](#)

Note: The Start time and End time are shown when the work item is being processed.

5. In the Work Item section, view the following:
  - a) Attributes of the selected work item.
  - b) Audit log comments (if any) that were added when editing the work item.
6. In the Automation section, view the name of the automation, bot name, and device pool under which this work item was processed.
7. In the Work Item Results section, view the output status of the work item processed in the Enterprise Control Room. This is retrieved from the \$workItemResult\$ variable which is included in the bot created for workload automation.
8. In the General Details section, view the Last modified date and time, Modified by, and Object type.

## Next steps

[Edit work items](#)

[Delete work items](#)

Related reference

[Work item status and actions](#)

## Edit work items

Use the Queues page or the Work item page to edit the work items of a queue.

## Prerequisites

You can edit a work item only if it is in a New, On hold, Data error, or Failed state.

## Procedure

1. To edit a work item, use any of the following methods based on where you are in the Workload page:

- Queues page:
  - a) Hover over a work item to edit it.
  - b) Click the Actions menu (vertical ellipsis).
  - c) Click Edit.
- Work Item page > Edit

The work item page appears in edit mode.

2. Change the work item status to Mark complete, Defer, or Re-process in the Work item attributes and automation details section.

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](#)

3. Click Save changes.

## Next steps

[Delete work items](#)

## Delete work items

Delete work items one at a time or in bulk in the View work item page.

### Procedure

1. Go to Workload > Queues.
2. Select and open the queue in view or edit mode.
3. Hover over a work item to view it.
4. Click the Actions menu (vertical ellipsis).
5. Click Delete.

The selected work item is deleted successfully.

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.

#### Related reference

[Work item status and actions](#)

## 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](#)

[Define Work Item structure](#)

# 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.

The All packages page lists all the packages in the Enterprise Control Room that are available for Bot Creators. Packages can have multiple versions.

## Manage packages

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:

## Update a package

- [Add packages to the Enterprise Control Room](#)  
Administrators can add packages to the Enterprise Control Room for use by Bot Creators.
- [Manage Enterprise Control Room packages](#)  
Manage packages in the Enterprise Control Room by setting a package as default, disabling it, or deleting it.

## Add packages to the Enterprise Control Room

Administrators can add packages to the Enterprise Control Room for use by Bot Creators.

### Prerequisites

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.

### Procedure

1. Navigate to Bots > Packages.
2. Click Add package.
3. Browse to the location of the package to add.  
Packages are Java Archive (JAR) files that contain actions used to create bots.
4. Select the package to add, and click Upload package.
5. On the Bots > Packages > Confirm package page, choose any of the following options:

| Option                            | Description                                                                                                                                                                      |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. |

### Next steps

Assign credentials to lockers for Bot Creators to access during the bot building process.

Related concepts

[Build and test a demo package and bot](#)

Related tasks

[Manage Enterprise Control Room packages](#)

## Manage Enterprise Control Room packages

Manage packages in the Enterprise Control Room by setting a package as default, disabling it, or deleting it.

### Prerequisites

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.

## Procedure

1. From the Bots > Packages page, click View package.
2. From the Bots > Packages > View package, choose any of the following options:

### 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](#)

### Related tasks

[Add packages to the Enterprise Control Room](#)

## 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.

- [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.

- [Create credential](#)

Create a credential and add the required attributes.

- [Create locker](#)

Create a locker to group similar credentials to share with other users.

- [Credential Vault email notifications](#)

When the email notification setting is enabled, it ensures that users are notified of any changes to credentials and lockers.

#### Related concepts

[RBAC for Credential Vault credentials management](#)

[Configure Credential Vault Connection mode](#)

## 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:

### Procedure

1. [Create a role](#)

Define a role and assign permissions to access various features for building bots.

2. [Create credential](#)

Create a credential and add the required attributes.

3. [Create locker](#)

Create a locker to group similar credentials and share with other users.

#### Related concepts

[RBAC for Credential Vault credentials management](#)

#### Related tasks

[Edit a credential](#)

[Edit a locker](#)

## Create credential

Create a credential and add the required attributes.

## Prerequisites

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.

Add up to 50 attributes to a credential.

## Procedure

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 the credential when adding the credential details. If no locker was created, create a locker and then assign the credential.

## Next steps

Assign this credential to a locker.

- [Edit a credential](#)  
Modify credential details and add or remove attributes.

### Edit a credential

Modify credential details and add or remove attributes.

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](#)

## Procedure

1. Go to BOTS > Credentials.
2. Click Edit credential.

- Mouse over the vertical ellipsis ( ) to the right of the credential to open the actions menu.
3. In the Edit credentials page, make the required changes.

If the email notification setting is enabled and credentials are added to a locker, then all the locker consumers receive an email.

4. After you complete editing the credential, click Save changes or click Cancel to undo the changes. 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.

Related reference

[Credential Vault email notifications](#)

## Create locker

Create a locker to group similar credentials to share with other users.

### Prerequisites

You must either have the **AAE\_Locker Admin** role or **Manage my credentials and lockers** permission. [RBAC for Credential Vault credentials management](#)

One locker can hold up to ten credentials. A credential can only belong to one locker. See [Create credential](#). Credentials are further divided in logical groups called lockers.

### Procedure

To create a locker, follow these steps:

1. Navigate to BOTS > Credentials > MY LOCKERS.
2. Click Create locker.  
The locker is created to store the credentials.
3. Enter the locker name, and optionally enter a locker description.
4. Select the Credentials to add to the new locker and click Next.  
The available credentials are displayed. Select one or multiple credentials from the list and add them to the locker.
5. Add the Owners and click Next.  
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.
6. Optional: Type 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.
7. 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.
8. 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.                                                 |

#### 9. 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.

#### Edit a locker

Add or remove credentials, owners, managers, participants, or consumer roles.

#### Prerequisites

Only a locker owner or locker admin can edit a locker.

#### Procedure

To edit a locker, follow the steps mentioned below:

1. Navigate to BOTS > Credentials > MY LOCKERS.

2. Click Edit locker.

Mouse over the vertical ellipsis ( ) to the right of the credential to open the actions menu.

3. You can make changes to the following:

- 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.

4. Click Save changes after you finish editing the locker.

## 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:

- [Users management](#)

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

- [Roles](#)

Administrators configure roles for permission to perform actions such as create a bot, edit, or delete it for various features and operations in Enterprise Control Room.

- [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.

- [Licenses](#)

The Automation Anywhere Enterprise Control Room provides an automated mechanism for tracking the use of licensed software.

- [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.

- [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.

#### Related tasks

[Create a role](#)

[Create user](#)

[Installing additional licenses](#)

[Create credential](#)

## Users management

As a Cloud user with administrator permissions, you can create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is a non-Active Directory, Active Directory, or an Single Sign On 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

Do the following tasks on an individual user:

#### View

Opens 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. It enables updates to 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.

#### 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 moved to another role. This free 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

Do the following tasks by hovering 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. See [Create user](#).

### 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 user](#)

Create a user and assign their specific license based role.

- [Reset user password](#)

The Enterprise Control Room administrator generates an email process for the user to reset their password.

## Create user

Create a user and assign their specific license based role.

To create a new user, follow these steps:

## Procedure

1. Navigate to Administration > Users.

2. Click Create user.

The icon is located at the top-right of the User table. The Create user page is displayed.

3. In the General Details section, supply 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 login immediately.                                                 |
| Username    | Type a unique user name.                                                                             |
| Description | Type a description for the user.                                                                     |
| First name  | Type the first name for the user.                                                                    |
| Last name   | Type the last name for the user.                                                                     |
| Password    | Type and confirm a password for the user. Ensure the password follows any necessary password policy. |

| Field | Value                                                                                                                                                                                                                                                                                               |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Email | Type 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 user-names. |

4. In the Select roles section, assign a role from the Available roles table. Mark the role to assign. Select multiple roles for the user as necessary. Click to move the roles to the selected column. For more information on specific roles and permissions, please see [Roles](#).
5. 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 <a href="#">Control Room</a> deployment, centralized scheduling, and API based deployment. |
| Attended Bot Runner - Run-time license   | Users with privilege to run bots on their workstations. These users can also make use of local schedules and triggers for time or event based automation.                                                                            |

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.

6. Click Create user or Create user and add another. 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.

Watch the following video on how to create a user in Enterprise A2019: Create user

- [Create an Active Directory user](#)

Add the Active Directory user by selecting AD domain, providing AD environment details, and assigning a role and device license.

# Create an Active Directory user

Add the Active Directory user by selecting AD domain, providing AD environment details, and assigning a role and device license.

To create a new user, follow these steps:

## Procedure

1. Click Create user.

The icon is located at the top-right of the User table. The Create user page is displayed.

2. In the General Details section, supply the following information:

- a) Enable User

Select for the user to be able to login immediately.

- b) Active Directory domain

Select the active directory name for the user. The list displays all 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 auto-populated. If the data is not auto-populated, type the details into the fields. 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.

If the username is not present in the Active Directory database, an error message is displayed. Contact the network administrator to resolve the issue.

3. In the Select roles section, assign a role from the Available roles table.

Mark the role to assign. Select multiple roles for the user as necessary. Click to move the roles to the selected column. For more information on specific roles and permissions, please see [Roles](#).

4. 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 <a href="#">Control Room</a> deployment, centralized scheduling, and API based deployment. |
| Attended Bot Runner - Run-time license   | Users with privilege to run bots on their workstations. These users can also make use                                                                                                                                                |

| License | Privilege                                                           |
|---------|---------------------------------------------------------------------|
|         | of local schedules and triggers for time or event based automation. |

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.

5. Click Create user or Create user and add another.

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.

Watch the following video on how to create a user in Enterprise A2019: Create user

## Reset user password

The Enterprise Control Room administrator generates an email process for the user to reset their password.

The change password email process.

## Procedure

1. Administrators navigate to Administration > Users.
2. Select the desired user from the list and click Edit user.
3. Click Send reset password email.

The selected user receives an email with the necessary instructions to reset the password.

Note: If there is not an email server configured, please follow these steps to reset a 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.

### Related tasks

[Log in to Automation Anywhere Enterprise Control Room](#)

## Roles

Administrators configure roles for permission to perform actions such as create a bot, edit, or delete it for various features and operations in Enterprise Control Room.

## Roles

Role-based access control (RBAC) grants access to users 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.

The Enterprise Control Room enforces role-based access control. There are two types of roles:

#### System-created

By default, these roles are preconfigured.

#### User-created

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 Admin role has this privilege.

## Default roles

### AAE\_Admin

This role 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.

### AAE\_Basic

This role provides permissions to upload and download TaskBots in the My Tasks folder. Limited access to other features.

### AAE\_Bot Developer

This role allows users to download bots or packages from the Bot Store to the Enterprise Control Room private workspace.

### AAE\_Bot Insight Admin

This role provides permission to view and manage data in Bot Insight. Limited access to Enterprise Control Room features. (If Bot Insight license is installed). This allows a user to access Bot Insight RESTful APIs to get access to the data logged by the Enterprise Control Room, and by a task during 'Production' run.

### AAE\_Bot Insight Consumer

This role provides permission to view data in Bot Insight. Limited access to Enterprise Control Room features. (If Bot Insight license is installed)

### AAE\_Bot Insight Expert

This role provides permission to manage data in Bot Insight. Limited access to Enterprise Control Room features. (If Bot Insight license is installed)

### AAE\_Bot Store Publisher

This role allows users to submit bots or packages to the Bot Store.

### AAE\_IQ Bot Admin

This role allows user to access all tabs, and manage settings and required configurations. The admin user can access the Dashboard, Learning Instances, Bots, Domains, and Administration Migration Utility tabs.

### AAE\_IQ Bot Validator

This role allows user to access the IQ Bot Validator screen. Limited access to Enterprise Control Room features. (For a Bot Runner with an IQ Bot license).

### AAE\_IQ Bot Services

This role grants a user the permissions to access the IQ Bot console. Limited access to Enterprise Control Room features. Bot InsightBot Insight, and IQ Bot roles are displayed only if you have respective licenses.

### AAE\_Locker Admin

This role allows the user to 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.

**AAE\_MetaBot Designer**

Only members of this role can access MetaBot Designer from the Enterprise client. MetaBot Designer is accessible for Bot Creators only.

**AAE\_Pool Admin**

This role allows user to view and manage all device pools.

Note: Users with AAE\_Pool Admin do not have permission to see any bots and supporting files.

**AAE\_Queue Admin**

This role allows the user to view and manage all queues.

**AAE\_Robotic Interface Admin**

This role allows the user to view all processes, managers, users, and teams. Users can perform global team, process, and case management activities.

**AAE\_Robotic Interface Manager**

This role allows the user rights to become a team owner. Users can perform team, case, and task management activities.

**AAE\_Robotic Interface User**

This role allows the user to perform case and task management activities.

## Permissions for roles

Only an administrator or Enterprise Control Room user with roles permission can assign roles to users and provide access to them for various features and operations. Assign the following permissions to a role:

**Dashboard**

View dashboards. Available to all users.

**Activity**

All users can view their own activity.

- In progress
- Scheduled
- Event Triggers
- Historical

**Event Triggers**

View and manage event triggers.

**Bots**

View manage bots, folders, credentials, values, and API

- My bots
- Manage credentials and lockers
- Create standard attributes for a credential
- View and edit all credentials and attribute values
- Bot Auto-Login credential API

**MetaBot**

Access to MetaBot Designer

**Package Manager**

- View packages
- Manage packages

An admin user can create a Package Manager role and assign permissions to view and manage packages.

## Devices

View, register, and manage all devices, Bot Runners, and device pools. View and manage BotFarm.

## Workload

View and manage my queues.

## Bot Store

- View Bot Store allows all Enterprise Control Room users to view the Bot Store.
- Add bots from Bot Store to My Bots allows users to add bots or packages from the Bot Store to the Enterprise Control Room private workspace.
- Submit bots to Bot Store allows users to submit bots or packages to the Bot Store.

## Audit Log

View all audit log actions.

## Administration

View and manage settings and is available only for the Enterprise Control Room and Community Control Room administrators and cannot be granted to any other roles.

- View and manage users
- View and manage roles
- View and manage migration
- Allow a bot-runner user to run migrations
- View, manage and install licenses

## API

- Bot Insight Data API
- Generate API-Key

## IQ Bot

View and manage:

- Learning instances
- Domains
- Administration: settings and migration

## Discovery Bot

View and manage:

- Processes
- Recordings
- Opportunities
- Aggregations

## Table-level Enterprise Control Room actions

Use the table-level actions to perform the following tasks:

### Create user

Creates a user and assigns the selected roles.

### Create role with checked items

Creates a role with selected features.

### Export checked items to CSV

Exports a selected item to a CSV file.

**Delete checked items**

Deletes selected roles. A role cannot be deleted if there are users assigned to it.

**Refresh table**

Refreshes the table.

**Customize columns**

In the table, shows or hides the column.

- [Create a role](#)

You can define a role and assign permissions to access various features of the Enterprise Control Room.

- [Bot permissions for a role](#)

Assign bot permissions when creating a role.

- [Active Directory role mapping](#)

The role mappings feature maps Active Directory (AD) security groups to one or multiple roles in the Enterprise Control Room.

**Related concepts**

[Bot permissions for a role](#)

**Related tasks**

[Create a role](#)

## Create a role

You can define a role and assign permissions to access various features of the Enterprise Control Room.

## Prerequisites

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.

Follow these steps to create the role.

## Procedure

1. Navigate to Administration > Roles.
2. Click Create role.
3. Enter a Role name, and optionally Role description.
4. Select a new role permissions:  
Default permissions:
  - a) View dashboards
  - b) View my in progress activity
  - c) Manage my credentials and lockers
  - d) View and manage my Bot runners, Bot creators and device pool
  - e) View and manage my queues

**Activity**

Allows users to manage in progress bot activities.

**Event Triggers**

Allows users to manage event trigger options.

**Bots**

Allows users to manage bots options.

**Package Manager**

Allows users to manage packages.

**Devices**

Allows users to manage device options.

**Workload**

Allows users to manage queues.

**Bot Store**

- View the Bot Store
- Add bots from the Bot Store to My Bots
- Submit bots to the Bot Store

**Audit Log**

Allows users to manage audit log actions.

**Administration**

Allows users to access administrative permissions.

**API**

Allows users to access API options.

**IQ Bot**

Allows users to view IQ Bot options.

5. Click Next.

6. In the Users tab, assign your role to existing users.

Users shown as disabled cannot be selected if they have been deactivated by an Admin user. Also, your own user is reflected as disabled in the users' list and cannot be removed.

Tip: You can select multiple users for your role in the Users tab. This allows more than one user to be assigned the same role at a time, which reduces the effort unlike the Users landing page.

7. After you complete selecting users for your role, click Create role.

**Related concepts**

[Bot permissions for a role](#)

**Related reference**

[Roles](#)

**Bot permissions for a role**

Assign bot permissions when creating a role.

**TaskBots and other supporting files**

Select from the following permissions:

- Select all - This permission includes check in, check out, delete, run plus schedule actions.
- Run plus Schedule - This permission includes run and schedule permission for TaskBots.
  - This permission is termed as Run when the user has the Run my bots feature permission. You can explicitly select Run permission on a specific folder to allow the user to run all bots that belong to this folder.
  - This permission is termed as Schedule when the user has Schedule my bots to run feature permission. You can explicitly select Run permission on a specific folder to allow the user to schedule all bots that belong to this folder.
  - Run plus Schedule when the user has both the feature permissions. This allows the user to run and schedule bots that belong to this specific folder on which the permission is selected.

- Check in: This permission allows users to check in TaskBot files or folders to the public workspace from the private workspace. For this permission, the Clone and View content permissions will be automatically enabled. These permissions cannot be disabled.
- Check out: This permission allows users to check out TaskBots files or folders from the public workspace. It creates an editable copy of the bot and the bot can be checked out by one user at a time. For this permission, the Clone and View content permissions will be automatically enabled. These permissions cannot be disabled. To check out dependent folders and files, you must have the Check out permission on the dependency folder.
- View content: This permission allows 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: This permission allows the user to create a read-only copy of the bot from the public workspace to the private workspace. This 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: You cannot move or rename cloned bot in your private workspace. You must have the View content permission on the same folder in the public workspace to view the content of your cloned bot in the private workspace.
- Delete: This permission allows users to remove files and their dependencies from the Enterprise Control Room.
- View Dashboards: This permission allows users to view Bot Insight dashboards.
- Bot Store:
  - View the Bot Store: This permission allows users to view the Bot Store.
  - Add bots from the Bot Store to My bots: This permission allows users to download bots from the Bot Store to the Enterprise Control Room repository.
  - Submit bots to the Bot Store: This permission allows users to submit bots to the Bot Store.

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.

Related tasks

[Create a role](#)

## 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 Paul 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 Paul 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.
- [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.
- [Sync Active Directory role mapping](#)  
Manually or automatically synchronize (sync) role mappings between the Active Directory and Enterprise Control Room.
- [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.
- [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.

## 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.

### Prerequisites

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.

## Procedure

1. From the Enterprise Control Room, navigate to Administration > Roles.
2. Click the ACTIVE DIRECTORY ROLE MAPPING tab.
3. Click Create Role Mapping.  
This enables you to create a mapping between an existing AD security group and the available role.
4. Enter a name for your mapping in the Mapping name field.
5. Click the Active Directory domain drop-down list, 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 the selected group.
8. Use Available Roles to assign a role.  
You can also use the Search name field to search for an available role.
9. Select the roles you want to assign, and click the right arrow to add it.  
The selected roles are listed under the Selected field.
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.

## Procedure

1. From your Enterprise Control Room, navigate to Administration > Roles.
2. Click the ACTIVE DIRECTORY ROLE MAPPING tab.  
All the available role mappings are listed in the Role Mappings table.
3. For a specific role in the roles list, hover over the action menu (vertical ellipsis) and select the Edit role mapping option.
4. In the Edit an Active Directory role mapping window, edit the Mapping name.  
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.
5. 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.
6. Click Save changes.  
Changes to mapping name or roles are updated in the audit log.

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.

## Procedure

1. Navigate to Administration > Roles.
2. Click the ACTIVE DIRECTORY ROLE MAPPING tab.  
All the available role mappings are listed in the Role Mappings table.
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.  
One or more available role mappings that match your search criteria appear in the Role Mapping table.
4. Hover over the action menu (vertical ellipsis) and select the View role mapping option.  
All the associated MAPPING DETAILS and Mapped Roles are listed.

# 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.

## Procedure

1. Navigate to Administration > Roles.
2. Click the ACTIVE DIRECTORY ROLE MAPPING tab.  
All the available role mappings are listed in the Role Mappings table.
3. For a specific role in the roles list, hover over the action menu (vertical ellipsis) and select the Delete role mapping option.
4. Click Yes, delete to delete the selected role.

# 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](#)

### 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](#)

### 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

- [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. The RDP session is created using the set screen resolution during bot deployment.

- [Network access](#)

Ensures that access to the Cloud Control Room URL is not allowed from outside a specified list of designated IP addresses.

- [Set up SAML authentication](#)

Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).

- [Configure Credential Vault Connection mode](#)

Credential Vault is a centralized location for securely storing credential information used by bots.

- [Edit email notifications](#)

Specify details about the email server you want to use and the events when the email notification must be sent.

- [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.

- [Usage statistics](#)

Automation Anywhere collects usage statistics from Enterprise A2019 for product improvements.

- [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.

- [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.

#### Related tasks

[Set up SAML authentication](#)

[Edit email notifications](#)

## 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. The RDP session is created using the set screen resolution during bot deployment.

## Procedure

1. Go 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.

## 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 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.

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.

- [Add access IP addresses](#)

Add addresses one at a time, or as a range of addresses to limit network access to the Control Room URL.

#### Related tasks

[Add access IP addresses](#)

## Add access IP addresses

Add addresses one at a time, or as a range of addresses to limit network access to the Control Room URL.

### Prerequisites

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 Identity provider to restrict access to specific allowed IP addresses.

### Procedure

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.
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. Optional: Enter a name or description for the configured IP addresses or IP subnet.
6. Click Save changes.

### Set up SAML authentication

Switch an authenticated environment Enterprise Control Room database to a SAML identity provider (IDP).

## Prerequisites

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](#).

## Procedure

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         | Description                        |
|----------------|------------------------------------|
| 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.

## Next steps

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](#)

## Edit email notifications

Specify details about the email server you want to use and the events when the email notification must be sent.

## Procedure

To configure Email settings, perform these steps:

1. Click ADMINISTRATION > Settings.
2. Expand the Email tab and 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:
  - 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.
  - Select the My server uses a secure connection (SSL/TLS) option if the server uses a secured connection.
  - Select the My server requires authentication option if the server requires credentials for access.

Specify the Username and Password you want to use to access the server.

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 of your choice, 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.

- [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.

## 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.

### Prerequisites

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.

### Procedure

1. In the Enterprise Control Room, navigate to Administration > Settings > Git Integration.
2. In the Git Integration window, select Set up Git Integration.
3. In the Credentials menu, perform these steps:
  - a) Enter your Git repository path in the User Name field in the following format:  
`https://<username>@github.com/.../....git`  
Note: Use the Git host that you want to obtain the Git repository address.
  - b) Enter your Git repository password and confirm your password.
  - c) Click Submit.
4. Click Connect and Save.  
The Enterprise Control Room connects to the remote Git repository.

## 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.

### Prerequisites

Ensure that you have the [AAE\\_Admin](#) role assigned to you.

## Procedure

1. Navigate to Administrators > Settings > Git Integration.
2. In the Git Integration window, click Edit.
3. Select Do not set up Git integration.
4. 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.

## 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.

## Disable usage statistics

An administrator can disable the Usage statistics option by changing the settings in the Enterprise Control Room.

## Procedure

1. Log in to the Enterprise Control Room using your admin credentials.
2. Navigate to Administration > Settings > General > Advanced settings.
3. Click Edit.
4. Select the Disabled option.
5. 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.

### Prerequisites

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.

### Procedure

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.  
The trusted relationship between the instances is created.
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.

### Prerequisites

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.

## Procedure

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:

0. To launch the setting in edit mode, click the Edit option.  
The option defaults to Keep current key.
1. To generate a new registration key, select the Generate a new key option.
2. Select Continue on the Current registration key replacement message box.
3. To use the key, click Copy to clipboard.
4. Save the updates.

## Next steps

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.

## 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.

## Prerequisites

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.

## Procedure

1. Navigate to <application filepath>\cru\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.

### Installing additional licenses

Upload new licenses to the Automation Anywhere Enterprise Control Room to be distributed to users as required.

## Prerequisites

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.

## Procedure

1. Navigate to Administration > Licenses.
2. Select Install license from server or Install license from file.

| Option                      | Action                                                                           |
|-----------------------------|----------------------------------------------------------------------------------|
| Install license from server | a) Supply the unique Control Room GUID.<br>b) Click Install license from server. |
| Install license from file   | a) Browse to and select the license.<br>b) Click Install license from file.      |

Related reference

[Users management](#)

[Roles](#)

[Settings](#)

## 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.

### Prerequisites

Log in to your Automation Anywhere Enterprise Control Room server.

### Procedure

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 elastisearch
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.

## 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 \(A-People login required\)](#).

- [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.

- [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.

- [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.

Related concepts

[Bot permissions for a role](#)

## 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.

### Prerequisites

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.

### Procedure

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. How to find bots and on Bot Store

Related concepts

[Bot Store](#)

Related tasks

[Submit bots or packages to Bot Store](#)

[Download bots or packages to the Enterprise Control Room](#)

## 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.

### Prerequisites

You must have a system-created AAE\_Bot Store Publisher role in order to submit bots or packages to Bot Store. See [Roles](#).

### Procedure

1. Log in to the Enterprise Control Room.
  2. Log in to Bot Store using the Bot Store credentials.
  3. Click BOTS > My bots.
  4. Click Public workspace and select the Bot Store folder.
  5. 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 to submit and the bundled package look complete, click Submit. 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.

Watch the following video on how to create and submit bots to Bot Store.

[How to create and submit bots to Bot Store](#)

#### Related concepts

[Bot Store](#)

#### Related tasks

[Access Bot Store from the Enterprise Control Room](#)

[Download bots or packages to the Enterprise Control Room](#)

## 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.

### Prerequisites

You must have a system-created AAE\_Bot Developer role in order to download bots or packages to your Enterprise Control Room repository. See [Roles](#).

## Procedure

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.

[How to download a Bot Store bot to your Enterprise Control Room](#)

Related concepts

[Bot Store](#)

Related tasks

[Access Bot Store from the Enterprise Control Room](#)

[Submit bots or packages to Bot Store](#)

## 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.

- [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 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.

- [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 and manage bot ideas using Private Bot Store](#)

Use Private Bot Store to submit, manage, and prioritize bot ideas for your development requirements.

Related concepts

[Private Bot Store](#)

## 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.

### Procedure

- 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

1. Navigate to User Access Settings.

2. Click Add Users.

3. 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](#)

## 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.

### Procedure

- 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](#)

## 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.

### Procedure

- Submit internal bots:

To submit a new bot:

1. From Private Bot Store, click My Submissions.
2. Click Add New Bot.
3. Enter all the required fields, such as bot description, benefits, and requirements.
4. Review the documentation examples for each field and follow the suggested guidelines.
5. 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.

1. As an admin user, navigate to Private Bot Store and click All Submissions.
2. Click Review Bot to review each submitted bot.
3. 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.

## Procedure

- Submit bot ideas
  1. From Private Bot Store, click Suggest Bot Idea.
  2. Fill in all the fields about your bot idea, with as much detail as possible.
  3. 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.
  1. As an admin user, navigate to Private Bot Store and click Manage Bot Ideas.
  2. Click Review to review each submitted bot idea.
  3. Edit any of the fields as required.
  4. Select a Bot Priority level for the bot idea.
  5. Click Save.
  6. 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.

How to submit bots to Bot Store

## 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.

This feature easily integrates with the DevOps workflow that supports separate development, testing, acceptance, and production environments and it enables you to seamlessly move bots along with their dashboards from one environment to another.

The BLM feature also enables you to move bots within different environments and helps you to 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.

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.

To export a bot from the Enterprise Control Room, you must have the Export bot and View packages feature permission and the Check in or Check out folder permission.

To import a bot to the Enterprise Control Room, you must have the Import bot and Manage package feature permissions and the Check-in folder permission.

- [Export bots](#)

You can export a bot from one Enterprise Control Room to another.

- [Import bots](#)

You can import bots with their dependencies from one Enterprise Control Room to another.

Related concepts

[Bot Lifecycle Management API](#)

## Export bots

You can export a bot from one Enterprise Control Room to another.

### Prerequisites

- Only bots within the public workspace can be exported. To export bots, first check these bots into the public workspace before exporting them into the private workspace.
- Ensure that you have the correct role and permissions to import and export bots, including View package permissions.
- To receive link to the exported package through email, enable SMTP.

[Configuring email server](#)

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.

### Procedure

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.  
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.

### Next steps

Import the bots into an Enterprise Control Room.

---

Related tasks[Import bots](#)[Export files using API](#)

Related reference

[Roles](#)

## Import bots

You can import bots with their dependencies from one Enterprise Control Room to another.

### Prerequisites

- 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, only if importing to the public workspace
- The bot 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 bot execution failure.
- Only users with a Bot Creator license have option to import bots either into the private workspace or public workspace.
- Users can import bots into the public workspace if they have the required permissions, regardless of their license.

If the required bot has already been exported, an email is received with the link to the zip file containing the package to import. If the email is not configured, you can access the link to download the zip file by navigating to Activity > Historical page.

[Export bots](#)

### Procedure

1. Navigate to BOTS > My bots.
2. Click Import bots. Browse and select the required zip file to import the bots.  
To import the 11.x bots, select the required aapkg file.
3. Select the option to import a bot into the private workspace or public workspace.  
Only users with a Bot Creator license can choose from the Public tab and Private tab.
4. If some of the files that are being imported from the package are already available in your Enterprise Control Room, you can choose from the following options:
  - Skip the bot or file (don't import it)
  - Overwrite the bot or file with the imported one
5. Click the Import bots icon.
6. Navigate to the corresponding repository (private or public, based on your selection in Step 3) to find and select the imported bot.

[Migrate Enterprise bots](#)

Related tasks

[Export bots](#)[Import files using API](#)

Related reference

[Roles](#)

# Enterprise Control Room APIs

The Automation Anywhere Enterprise Control Room provides various public APIs that allow you to customize your business automation for third-party applications.

These APIs enable third-party applications to consume RPA, orchestrate bots, and manage the RPA data based on events.

- [Audit API](#)

Requests 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 JSON Web Tokens (JWT) that are required for authorization in all Enterprise Control Room APIs.

- [Device API](#)

Identify all available users with unattended Bot Runner licenses, or filter for users by name.

- [Bot Deploy API](#)

Deploy bots from the public repository to Bot Runner devices.

- [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.

- [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.

- [Credential Vault API](#)

As an Enterprise Control Room user with Manage my credentials and lockers role permissions, you have the option to use the Credential Vault API to manage your attributes, credentials, keys, lockers, and Credential Vault mode in the Enterprise Control Room.

- [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).

- [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.

- [Migration APIs](#)

The Migration APIs allow users with the appropriate migration permission to view or manage bot migration from 11.x to A2019, including starting the migration of bots and retrieving details about migrations.

- [Repository Management API](#)

The Repository management API is a role based access API that returns information for folders and files that you have permission to view in your Enterprise Control Room.

- [User management APIs](#)

Use User Management APIs to create, search, update, or delete roles and users in your .

- [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.

- [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.

- [API response codes](#)

Review the HTTP status codes of responses for Enterprise A2019 APIs.

## Audit API

Requests audit data for a given input combination of date filter, sorting mechanism, and pagination.

### Prerequisites

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.

#### JSON Web Token (JWT)

All Enterprise Control Room APIs require a JSON Web Token (JWT) to access the APIs. Generate an authentication token using the [Authentication API](#). A JWT is required to run all Enterprise Control Room APIs.

#### Roles and license

Users with the AAE\_Admin role or users with the View everyone's audit log actions permission are able to view audit logs for the Enterprise Control Room.

- URL: `http://<your_control_room_url>/v1/audit/messages/list`
- Method: POST

Note: Use the Swagger definition files installed with your Enterprise A2019 Edition to test the APIs, or use a REST client.

### Procedure

1. Add an authentication token to the request header.

Note: Use the [Authentication API](#) to generate a JSON Web Token.

2. Select POST as the method.

Note: 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. Refer to the [Filters in an API request body](#).

The following example requests unsuccessful login attempts for the month of December.

Request body:

```
{
  "sort": [
    {
      "field": "createdOn",
      "direction": "desc"
    }
  ],
  "filter": {
    "operator": "and",
    "filters": [
      {
        "field": "eventCode",
        "operator": "eq",
        "value": "UNSUCCESSFUL_LOGIN_ATTEMPT"
      },
      {
        "field": "dateCreated",
        "operator": "gt",
        "value": "2019-12-01T00:00:00Z"
      },
      {
        "field": "dateCreated",
        "operator": "lt",
        "value": "2019-12-31T23:59:59Z"
      }
    ]
  }
}
```

```

"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@myemail.com"
    }
],
"fields": [],
"page": {
    "length": "1000",
    "offset": "0"
}
}

```

3. Send the request.
  - In Swagger, click Execute.

- In a REST Client, click SEND.

The response for this example returned data for date filter, sorting, and pagination. When there is no filtering 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": "X1Hj6G4BFXSpOOji5B7S",  
      "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": "g1Hj6G4BFXSpOOji2Rwx",  
      "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": "31Hj6G4BFXSpOOjivRdV",
"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": "2019-12-09T04:21:09Z",
"requestId": "cad26f91-8f13-4509-8a30-48c0e7462339",
"createdBy": "0"
},
{
"id": "2jyk6G4BFXSpOOji5MAg",
"eventDescription": "User provided incorrect password.",
"activityType": "LOGIN",
"environmentName": "",
"hostName": "12.xxx.xx.x",
"userName": "joe.typical@myemiil.com",
"status": "Unsuccessful",
"source": "Control Room",
"objectName": "N/A",
"detail": "",
"createdOn": "2019-12-09T03:12:30Z",
"requestId": "b20083fb-a6d5-43ac-af50-944e4aea6fd9",
"createdBy": "0"
},
```

```
{  
    "id": "Wjyk6G4BFXSpOOjiu6z9",  
    "eventDescription": "User does not exist in Control Room.",  
    "activityType": "LOGIN",  
    "environmentName": "",  
    "hostName": "12.xxx.xx.x",  
    "userName": "joe.typical@myemail.com",  
    "status": "Unsuccessful",  
    "source": "Control Room",  
    "objectName": "N/A",  
    "detail": "",  
    "createdOn": "2019-12-09T03:12:20Z",  
    "requestId": "a936ac6a-4962-40fd-92b5-2f03c2df66c4",  
    "createdBy": "0"  
,  
{  
    "id": "ezyk6G4BFXSpOOjilaFv",  
    "eventDescription": "User does not exist in Control Room.",  
    "activityType": "LOGIN",  
    "environmentName": "",  
    "hostName": "12.xxx.xx.x",  
    "userName": "joe.typical@myemail.com",  
    "status": "Unsuccessful",  
    "source": "Control Room",  
    "objectName": "N/A",  
    "detail": "",  
    "createdOn": "2019-12-09T03:12:10Z",  
    "requestId": "6f520201-6a6a-4d24-8fbc-82ea5e5a6fea",  
    "createdBy": "0"  
,  
{  
    "id": "JDyk6G4BFXSpOOjihZ-C",  
    "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": "2019-12-09T03:12:06Z",
"requestId": "61bb3ef8-2a06-4fab-adaf-172a78ca99a5",
"createdBy": "0"

},
{

"id": "7jyk6G4BFXSpOOjieJnK",
"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": "2019-12-09T03:12:03Z",
"requestId": "04d5b586-cc5b-4d3b-a78b-aaf364c1ceb4",
"createdBy": "0"

},
{

"id": "ETyk6G4BFXSpOOjiaJjt",
"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"
  }
]
}

```

Response headers:

```

cache-control: no-cache, no-store, max-age=0, must-revalidate
content-encoding: gzip
content-length: 739
content-type: application/json
date: Mon, 09 Dec 2019 18:41:36 GMT
expires: 0
pragma: no-cache
status: 200
vary: Accept-Encoding, User-Agent
x-content-type-options: nosniff
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block

```

Note: You can also run REST requests from a command terminal. The following is a curl request example. This example is formatted for readability.

```

curl -X POST "https://product.supremomono.com/v1/audit/messages/list" -H "accept: application/json" -H "X-Authorization: eyJhbGciOiJSUzUxMiJ9eyJzdWIiOiI1MiIsImNsaWVudFR5cGUIOiJXRUIiLCJsawN1bnNlcyl6WyJERVZFTe9QTUVOCJdLCJhbmFseXRpY3NMaWN1bnNlc1B1cmNoYXNlZCI6eyJBbmFseXRpY3NDbG11bnQiOnRydWUsIkFuYWx5dGljc0FQSSI6dHJ1ZXOsInRlbmFudFV1aWQiOjRhODc5MjE1Ny1jYjRmLTi3ZmItOTQ5Yy0wMzVmNDU1MThjNjEiLCJpYXQiOjE1NzU5MTY1MTksImV4cCI6MTU3NTkxNzcxOSviaXNzIjoiQXV0b21hdGlvbkFueXdoZXJlIiwibmFub1RpBWUiOjE0NDA0MTcwMDUxOTY1NzV9.IrmSOOzqE4pq09i0cLazsFoXkjKuw9eRVo9e6eaZWVlIrYGAcnJJ3zeeJrmi8HXUMsnCbYnLn-q2Y6HQTrqrCoifnsQ9qrvoSB1-WUM1LXXc2Jw31r18i4J3yM11YwSNJ5-EvfS0pVf-tiDpdfHBWm9gGfaJzStKRx_TcGHaCN5_iCj3ZzbKGDGUqfEv7v4bkk_xwJCWJ2TnyY8gacktS3fBZb354OFJLoz8LYlnBt-e9Y3yus9aM6qIsGSrg9vwsu3b7wN7b44b-rpNmfwiqN54_UWVLvTblyNh8DOAd5B4uimFkPho3p1vY0so14Tpfc59ztpkQS8lnqZbBWw" -H "Content-Type: application/json" -d "{ \"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\": \"nafis.keshwani\" } ] }, \"fields\": [], \"page\": { \"length\": \"1000\", \"offset\": \"0\" } }"
```

Related concepts

[Example for createdOnDate and userName filters for Audit API](#)

## Example for createdOnDate and userName filters for Audit API

Create a filter that finds audit log entries for a specified date range for user with a specific string in their userName.

## Request body

Finding the audit log entries you need is a formidable task. Use filtering to help narrow your results. The following example request identifies unsuccessful logins for users with the string "john,doe" in their userName from December 1, 2019 to December 7, 2019.

Example:

```
{
  "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": "2019-12-07T23:59:59.999Z"
      }
    ]
  }
}
```

```
        "value": "2019-12-31T23:59:59.999Z"
    },
    {
        "operator": "eq",
        "field": "status",
        "value": "Unsuccessful"
    },
    {
        "operator": "substring",
        "field": "activityType",
        "value": "LOGIN"
    },
    {
        "operator": "substring",
        "field": "userName",
        "value": "john,doe"
    }
],
},
"page": {
    "length": "1000",
    "offset": "0"
}
}
```

## Response body

This request identified 3 audit log entries out of 731,148,339 entries from this Enterprise Control Room's log entries.

```
{
    "page": {
        "offset": 0,
        "total": 731148339,
        "totalFilter": 3
    },
    "list": [

```

```
{  
    "id": "kLjB8G4BFXSpOOjiomK1",  
    "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": "2019-12-10T17:00:52Z",  
    "requestId": "3c0f8e47-5820-43e8-b2b3-83b2f1cb86c9",  
    "createdBy": "0"  
,  
{  
    "id": "SLjB8G4BFXSpOOjikl5i",  
    "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": "2019-12-10T17:00:48Z",  
    "requestId": "eba3e5a7-0034-440a-a786-110a84fea7c9",  
    "createdBy": "0"  
,  
{  
    "id": "7bjB8G4BFXSpOOjicEGO",  
    "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": "2019-12-10T17:00:39Z",
    "requestId": "64184450-aad5-4024-bcf5-491fb5276d0c",
    "createdBy": "0"
  }
]
}

```

#### Related concepts

[Filters in an API request body](#)

#### Related tasks

[Audit API](#)

## Authentication API

Use the Authentication API to generate, refresh, and manage JSON Web Tokens (JWT) that are required for authorization in all 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.

The JWT is a text string with 703 characters:

```
{
  "token": "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwiY2xpZW50VHlwZSI6IldFQiIsImxpY2
Vuc2VzIjpbXSwiYW5hbHl0aWNzTG1jZW5zZXNQdXJjaGFzzWQiOnsiQW5hbHl0aWNzQ2xpZW50Ijp0c
nV1LCJBbmFseXRpY3NBUEkiOnRydWV9LCJpYXQiOjE1NzMxMDc4NzMzMmV4cCI6MTU3MzEwOTA3Mywi
aXNzIjoiQXV0b21hdGlvbkFueXdoZXJlIiwbmFub1RpbWUiOjM2NTc1NjI0OTQ2MzE2MDAsImNzcmZ
Ub2t1biI6ImNiZjgwZWNkZmU5YmUwYzViOGI2MDk3NmU0ZTI2MTNiIn0.rGYxbS5kKUTxtZhYtRSXpm
IHwbf3IwLBKDEA7odG5uGVAjD55Tv05bYdARx_3-t11CBg_cDGBwj5FvaBt9u5xKu5W5j3Nur6x3PF
62NeB3ZIdxiUPaFBU0Br84mPJMD4_EpwBfbeSVOMH6ngiLTJYhIOtJa0kp4pAAm3mvkuOUELth8lf3p
Qf-20se2fUAaebDkqiH13SUF1TONAjUQv6Ef_uY0wgq9SjZwKHg9SKUhX3S8PXAJne_ih2QnN8nUE1S
XG1kC04eoIvyWpFkM963XEjptc2uvwtVn42MdA4Nd1opD5yijE19VM92Fe1sPb6_T5-oV-U1Iw0JHiX
2-Ug", . . .
}
```

## auth

**POST** `http://<your_control_room_url>/v1/authentication`

Body parameters:

```
{
  "username": "string",
  "password": "string",
  "apiKey": "string"
}
```

Make a post request to generate a JWT.

- The `username` of the Automation Anywhere user.
- The `password` of the Automation Anywhere user.
- The `apiKey` is required to configure Single Sign On (SSO). It can also be used in place of a password for users that are assigned to the [API key generation role](#).
- A JWT is required in the header of other Enterprise Control Room APIs.
- Authentication tokens have a default timeout of 20 minutes.

Not all parameters are required to generate an authentication token. However, for an Enterprise Control Room that is deployed on Cloud and has SAML authentication enabled, use `username` and `apikey` to generate the authentication token.

See the following examples for detailed information:

- [Authenticate with username and password](#)
- [Authenticate with username and apiKey](#)

Note:

- Simple and Protected Negotiation GSSAPI Mechanism (SPNEGO)

You can use SPNEGO (pronounced "spenay-go") when your Enterprise Control Room is configured properly with the following authentication features:

- Active Directory (AD) mode of authentication
- AD is Kerberos enabled

In an Enterprise Control Room with SPNEGO properly configured, users do not need to enter a `username` and `password` to generate a JWT.

- SPNEGO Authentication API URL example:

`https://<your_control_room_url>/v1/authentication/SPNEGO`

**GET** `http://<your_control_room_url>/v1/authentication/token/{token}`

URL parameter:

The token you are validating.

Note: The token is passed as a parameter in the URL. There are no parameters for the request body.

See [Validate an authentication token](#) for task details.

**POST [http://<your\\_control\\_room\\_url>/v1/authentication/token](http://<your_control_room_url>/v1/authentication/token)**

Body parameter:

A refresh token allows you to get a new token without the need to collect and authenticate credentials every time a token expires.

```
{
  "token": "string"
}
```

Click [Refresh an authentication token](#) for a detailed example of this API.

**POST [http://<your\\_control\\_room\\_url>/v1/authentication/logout](http://<your_control_room_url>/v1/authentication/logout)**

Header parameter:

Immediately expires the token that you add to the header of the request.

```
POST 'http://<your_control_room_url>/v1/authentication/logout'
-H 'X-Authorization: <access_token>
```

Click [Immediately logout \(expire\) an authentication token](#) for a detailed example of this API.

**POST [http://<your\\_control\\_room\\_url>/v1/authentication/app/login](http://<your_control_room_url>/v1/authentication/app/login)**

The .../authenticataion/app/login API is a service to service authentication API used by Automation Anywhere internally supported applications. This API is not supported for use by external users.

## Authenticate with username and password

Make a POST request with a `username` and `password` to generate a JSON Web Token (JWT) to use for authentication in Enterprise Control Room APIs. For an Enterprise Control Room that is deployed on Cloud and has SAML authentication enabled, make a POST request with `username` and `apikey` to generate the authentication token.

## Prerequisites

- Valid username and password for your Enterprise Control Room
- REST client or access to Automation Anywhere Swagger for your Enterprise Control Room.

Note: Passwords are 8-15 characters and contain the characters: a-z, A-Z, 0-9, at sign (@), dash (-), underscore (\_), exclamation (!), pound (#), dollar (\$), percent (%), ampersand (&), and period (.).

- URL: [http://<your\\_control\\_room\\_url>/v1/authentication](http://<your_control_room_url>/v1/authentication)
- Method: POST

## Procedure

1. Enter the following parameters in the request body.

Request body:

```
{
  "username": "jdoe",
  "password": "mypassword@123"
}
```

Depending on how your Enterprise Control Room is configured, a domain could be required with the username.

```
{
  "username": "your-domain\\jdoe",
  "password": "mypassword@123"
}
```

## 2. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body:

Note: The JWT is a 703 character string.

```
{
  "token": "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwiy2xpZW50VHlwZSI6IldFQiIsImxpy2Vuc2VzIjpBXSwiYW5hbH10aNWNzTGljZW5zZXNQdXJjaGFzZWQiOnsiQW5hbH10aNWNzQ2xpZW50Ijp0cnV1LCJBbmFseXRpY3NBUEkiOnRydWV9LCJpYXQiOjE1NzMxMDc4NzMzMmV4cCI6MTU3MzEwOTA3MywiaXNzIjoiQXV0b21hdGlvbkFueXdoZXJlIiwibmFub1RpZWUiOjM2NTc1NjI0OTQ2MzE2MDAsImNzcmZUb2t1biI6ImNiZjgwZWNkZmU5YmUwYzViOGI2MDk3NmU0ZTI2MTNiIn0.rGYxbS5kKUTxtZhYtRSXpmIHwbf3IwLBKDEA7odG5uGVAjD55Tv05bYdARx_3-t11CBg_cDGBwj5FvaBt9u5xKu5W5j3Nur6x3PF62NeB3ZIdxiUPaFBU0Br84mPJMD4_EpwBfbeSVOMH6ngiLtzYhI0tJa0kp4pAAm3mvkuOUELth81f3pQf-20se2fUAebDkqiH13SUF1TONAjUQv6Ef_uY0wgq9SjZwKHg9SKUHx3S8PXAJne_ih2QnN8nUE1SXG1kC04eoIvyWpFkM963XEjptc2uvwtn42MdA4Nd1opD5yijE19VM92Fe1sPb6_T5-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
  },
  {
    "name": "AAE_Meta_Bot_Designer",
    "id": 13,
    "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
  }
}

```

#### Related concepts

[Authentication API](#)

## Authenticate with username and apiKey

Make a POST request with a username and API to generate a JSON Web Token (JWT) to use to authenticate in Enterprise Control Room APIs.

### Prerequisites

- A user with the Generate API-Key role  
Note: The Generate API-Key feature requires the creation of a custom role, see [Create and assign API key generation role](#).
- Generate API-Key
- Valid username and apiKey for your Enterprise Control Room
- REST client or access to Automation Anywhere Swagger files for your Enterprise Control Room.
- URL: `http://<your_control_room_url>/v1/authentication`
- Method: POST

Using a Generate API-Key enables users to create tokens without the need to gather user credentials.

### Procedure

1. Enter the following parameters in the request body.

Request body:

Note: The API-Key is a 40 character string.

```
{  
  "username": "jdoe",  
  "apiKey": "3/.Z)8:P`+yVJq . . . *fTk.i>|VOO1&:"  
}
```

Depending on how your Enterprise Control Room is configured, a domain could be required with the username.

```
{  
  "username": "your-domain\\jdoe",  
  "apiKey": "3/.Z)8:P`+yVJq . . . *fTk.i>|VOO1&:"  
}
```

Note: The API-Key Duration API-Key Duration can be configured by an Admin user from the ADMINISTRATION > Settings > General tab.

- Send the request.
    - In a REST Client, click SEND.
    - In the Swagger interface, click Execute.

Response body:

Note: The JWT is a 703 character string.

```
{  
  "token": "eyJhbGciOiJSUzUxMiJ9eyJzdWIoiIxIiwiY2xpZW50VHlwZSI6IldFQiIsImxpvY2Vuc2VzIjpBXSwiYW5hbH10aNzTG1jZW5zZXNQdXJjaGFzZWQiOnsiQW5hbH10aNzQ2xpZW50Ijp0cnVlLCJBbmFseXRpY3NBUEkiOnRydWV9LCJpYXQiOjE1NzMxMDc4NzMsImV4cCI6MTU3MzEwOTA3MyviaXNzIjoiQXV0b21hdGlvbkFueXdoZXJ1IiwibmFub1RpbWUiOjM2NTc1NjI0OTQ2MzE2MDAsImNzcmZUb2tlbiI6ImNizjgwZWNkZmU5YmUwYzViOGI2MDk3NmU0ZTI2MTNiiIn0.rGYxbS5kKUTxtZhYtRSXpmIHwbf3IwLBIKDEA7odG5uGVAjD55Tv05bYdARx_3-t11CBg_cDGbj5FvaBt9u5xKu5W5j3Nur6x3PF62NeB3ZIdxiUPaFBU0Br84mPJMD4_EpwBfbeSVOMH6ngiLtJYhI0tJa0kp4pAAm3mvkuOUELtH81f3pQf-20se2fUAaebDkqiH13SUF1TONAjUQv6Ef_uY0wgq9SjZwKHg9SKUhX3S8PXAJne_ih2QnN8nUE1SXG1kC04eoIvyWpFkM963XEjptc2uvwtVn42MdA4Nd1opD5yijEl9VM92Fe1sPb6_T5-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
},
{
  "name": "AAE_Meta_Bot_Designer",
  "id": 13,
  "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  
    }  
}
```

## Related concepts

## Authentication API

## Related tasks

Authenticate with username and password

## Refresh an authentication token

Refresh valid authentication tokens without the need to collect user credentials.

## Prerequisites

- The token you are refreshing.
  - REST client or access to Automation Anywhere Swagger files for your Enterprise Control Room.  
  - URL: `http://<your_control_room_url>/v1/authentication/token`
  - Method: POST

## Procedure

1. Enter the following parameters in the request body.

Request body:

```

2xpZW50Ijp0cnVlLCJBbmFseXRpY3NBUEkiOnRydWV9LCJpYXQiOjE1NzMxMDgwNjEsImV4cCI
6MTU3MzEwOTI2MSviaXNzIjoiQXV0b21hdGlvbkFueXdoZXJ1IiwibmFub1RpbWUiOjm2NTc3N
TA4OTY5NzUxMDAsImNzcmZUb2t1biI6ImJinjgzMGJhMDY5MWYwYjZim2M3MDE4NGY0OGM0MWY
1In0.f3kPRspfm0sei9DGhd9NoyLK-iCO-vs--8b_pLG9XSUR0186uvXFopB75eVAaG-11_AZh
R78UE6Voi7_UggzHkLrrEpQ-szR7cmFDpLxZ28xLnFJYhaIuMNdw9dWDVquBWTQSpYGNJd56D-
tFFHBodwVdNamqWHxaQebq1zMyUyQV6Q-gKdgubpT5gwuXnp-BwScjHOYM3Fpj_nt0nEbJC5uW
pJNtLQBpVzhsRww1RKNOHQVbo6X7zkvKBoij8ewa5FWQwX7T-760BeqfssR6mmMUo0zRaneUKA
YAskz0B-X5PcyCkrVJju2XqItQ9XMGNP7h_MaUDotU_CJyguPZA"
}

```

2. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body: A new token with an updated expiration time.

```
{
  "token": "eyJhbGciOiJSUzUxMiJ9.eyJzdWIiOiIxIiwiy2xpZW50VHlwZSI6IldFQiIsI
  mpxY2Vuc2VzIjpBXSwiYW5hbH10aWNzTG1jZW5zZXNQdXJjaGFzZWQiOnsiQW5hbH10aWNzQ2x
  pZW50Ijp0cnVlLCJBbmFseXRpY3NBUEkiOnRydWV9LCJpYXQiOjE1NzMxMTMxMTgsImV4cCI6M
  TU3MzExNDMxOCviaXNzIjoiQXV0b21hdGlvbkFueXdoZXJ1IiwibmFub1RpbWUiOjm2NjI4MDc
  1NDY4NjYzMAsImNzcmZUb2t1biI6ImUXODBIZjYxMzQyMjkwZTR1M2Q4M2Z1NTU3YWRmMmE5I
  n0.mtR1RNDe3EPzlaLQ7mwF0yIk8G00wLKGmKTFhM2689rItXHjLLgv0iYaM1LPUtRv9GafjhX
  fshcIm9lucyf8k8t3A7SVJFoiFY2TUNgeouPgH17XlpzpmenDRoT4OtU9R1_FTpMi40HH81ARG
  7WoLDpDoyhxgl9ZvoVtRgkMiNTn1vUJWGHzd6wMYzf70rJO_TcMKgLh3X6fpPkY_xD2ykrKsds
  MO21ZnzDjzuf3BCdzGjMj1q99WKBgVwyMafv4WApUX5peRZlsIVJdZrM2x890yovW2Yy_fY3wd
  P_57XRp1oA5vnm9FxJN91KyxBic3Qvx8BGtxmR-GQ3T8fndjw",
  "user": {
    "id": 1,
    "email": "a@a.com",
    "username": "admin",
    "domain": null,
    "firstName": "",
    "lastName": "",
    "version": 1,
    "principalId": 1,
    "deleted": false,
    "roles": [
      {
        "name": "Admin"
      }
    ]
  }
}
```

```
        "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](#)

#### Validate an authentication token

Send a REST request to verify if a token is valid.

#### Prerequisites

- The token you are validating.
  - REST client or access to Automation Anywhere Swagger files for your Enterprise Control Room.
- URL: `http://<your_control_room_url>/v1/authentication/token`
- Method: GET

## Procedure

1. Enter the following parameters to the request URL.

`http://<your_control_room_url>/v1/authentication/token?token=<token>`

2. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body:

The token is valid.

```
{
  "valid": true
}
```

The token is invalid.

```
{
  "valid": false
}
```

### Related concepts

[Authentication API](#)

## 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.

## Procedure

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.

## Next steps

Use the API-Key to log into an Enterprise Control Rooms using SSO, or use the API-Key to log in a user without the user's password.

---

Related tasks

[Authenticate with username and apiKey](#)

Immediately logout (expire) an authentication token

Immediately invalidate an access token so that it cannot be used for authentication.

## Prerequisites

- The URL for the Enterprise Control Room in which the token was generated
- The token to expire

## Procedure

1. Enter the following parameters to the request URL.

`https://<your_control_room_url>/v1/authentication/logout`

2. In a header for this request, enter the token that is to be expired.

Note: There are no body parameters in this request.

3. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

Response header:

Note: A 204 response code indicates that the request was successful and that there is no additional content to be sent to the response body.

```
Status Code: 204 No Content
cache-control: no-cache, no-store, max-age=0, must-revalidate
content-security-policy: default-src 'self'
content-type: application/json
date: Thu, 31 Oct 2019 08:37:35 GMT
expires: 0
pragma: no-cache
x-content-type-options: nosniff
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block
```

---

Related tasks

[Authenticate with username and apiKey](#)

## 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

Use the RunAsUsers endpoint to return a list of available users with unattended Bot Runner licenses. This endpoint returns user details including the id, which is a numeric value that is used by APIs to uniquely identify users in the Enterprise Control Room.

```
POST <control_room_URL>/v1/devices/runasusers/list
```

### How to find a user's id

Use the RunAsUsers endpoint to return a list of available users with unattended Bot Runner licenses. This endpoint returns user details including the id, which is a numeric value that is used by APIs to uniquely identify users in the Enterprise Control Room.

## Prerequisites

You need a custom role with the following permissions to deploy bots:

- Features:

### ACTIVITY

- Manage my in progress activity
- View my scheduled bots
  - Schedule my bots to run
  - Edit my scheduled activity
  - Delete my scheduled activity

### BOTS

- View my bots

- Run my bots

- Run and schedule permissions for the folders that contain the bots
- Access to the Bot Runner devices configured with auto-login

In order to deploy bots using APIs, you need to first retrieve the user ids of available unattended Bot Runners using the Device API.

## Procedure

To send an API request using a REST client, do these steps:

1. Add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.  
[Authentication API](#)
2. Select the POST method and enter the URI.

```
<control_room_URL>/v1/devices/runasusers/list
```

3. Provide the parameters by which to filter and sort the response.

The example request body below sorts by username in order from A to Z and returns information on a maximum of 200 users.

#### Request body

```
{
  "sort": [
    {
      "field": "username",
      "direction": "asc"
    }
  ],
  "filter": {},
  "fields": [],
  "page": {
    "length": 200,
    "offset": 0
  }
}
```

#### [Filters in an API request body](#)

4. Send the request.

#### Response body:

```
{
  "page": {
    "offset": 0,
    "total": 6,
    "totalFilter": 6
  },
  "list": [
    {
      "id": "9",
      "username": "ubr01_rt",
      "device": "DESKTOP-DB06SIE",
      "lastAccess": "2019-07-16T14:45:00Z"
    }
  ]
}
```

```
        "deviceId":"3"
    },
    {
        "id":"10",
        "username":"ubr02_rt",
        "device":"DESKTOP-DB06SIE",
        "deviceId":"3"
    },
    {
        "id":"11",
        "username":"ubr03_rt",
        "device":"DESKTOP-DB06SIE",
        "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"
    }
]
```

The response body returns details of the available users with unattended Bot Runner licenses. Next, provide the user ids to deploy bots. [Bot deploy task](#)

---

Related tasks

[Bot deploy task](#)

[How to find a device pool id](#)

[How to find a bot id](#)

## Bot Deploy API

Deploy bots from the public repository 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.

[Deploy bots to Bot Runner devices](#)

```
POST <control_room_URL>/v3/automations/deploy
```

Related concepts

[User management APIs](#)

Related tasks

[How to find a user's id](#)

[How to find a device pool id](#)

[How to find a bot id](#)

## Bot deploy task

As a registered Bot Runner, deploy bots on registered devices that are part of a device pool. You can also pass variables to bots when they are deployed.

## Prerequisites

You need a custom role with the following permissions to deploy bots:

- Features:

### ACTIVITY

Manage my in progress activity

View my scheduled bots

Schedule my bots to run

Edit my scheduled activity

Delete my scheduled activity

### BOTS

View my bots

Run my bots

- Run and schedule permissions for the folders that contain the bots
- Access to the Bot Runner devices configured with auto-login

**Note:**

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.

Deploy a bot and pass a variable value to the bot when it runs. You provide the following information to the API:

- fileId: the numeric identifier for the bot to be deployed. [How to find a bot id](#)
- runAsUserIds: the numeric identifier for a user that is registered with your Enterprise Control Room as an Unattended bot runner. [How to find a user's id](#)
- poolIds: the numeric identifier of a device pool that has at least one active device. [How to find a device pool id](#)
- botInput: the variable used by the bot. You can pass variable values at the time the bot is deployed. In this request example, the bot uses the variable sDocHello as input and output. The string field is the value passed from the API to the bot

## Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. Enter the request in valid JSON format.

```
{
  "fileId": 57911,
  "runAsUserIds": [
    2538
  ],
  "poolIds": [
    49
  ],
  "overrideDefaultDevice": false,
  "botInput": {
    "sDocHello": {
      "type": "STRING",
      "string": "Hello world, go be great."
    }
  }
}
```

```

        }
    }
}
```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND

Response body:

When successful, the Bot Deploy API returns a response with the deploymentId.

```
{
    "deploymentId": "14c2b6f8-c2a0-4a57-959d-ef413df0d179"
}
```

## Next steps

Use the Bot Execution Orchestrator API to list the activity for a specific deploymentID.

Request URL:

```
<your_control_room_url>/v2/activity/list
```

Request body:

```
{
    "filter": {
        "operator": "eq",
        "field": "deploymentId",
        "value": "14c2b6f8-c2a0-4a57-959d-ef413df0d179"
    }
}
```

Response body:

```
{
    "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"
  }
]
}

```

#### Related tasks

- [How to find a user's id](#)
- [How to find a device pool id](#)
- [How to find a bot id](#)
- [Search for users](#)
- [Create a new user](#)
- [Create a new role using the API](#)

# How to find a device pool id

How to find a device pool id from the Enterprise Control Room user interface.

## Prerequisites

- The username of the user to search for.
- Minimally you need the administrative permission to view View users.

A device pool id is required when using the Bot deploy API to manage bot deployments.

Note: Administrators can create users and roles from the Administration > Roles > All roles > Edit role page. Users should be given only the permissions needed for the required task.

## Procedure

1. Log on as a user that has permissions to View and manage ALL device(s) and Create device pools.  
Note: Because you are logged on to the Enterprise Control Room as a user that is assigned to a device pool, you are able to see device pools in My device pools.
2. Go to DEVICES > My device pools.
3. In the DEVICE POOL NAME column, click the device pool you want to use.
4. Look in the Enterprise Control Room URL to see the device pool id.

```
<your_control_room_url>/#/devices/mydevicepools/49/edit
```

In this example, the device pool id is 49.

### Related tasks

[Bot deploy task](#)

[How to find a user's id](#)

[How to find a bot id](#)

# How to find a bot id

The fileld used in the Bot Deploy API is the numeric identifier for the bot. Each bot has a unique numeric identifier.

## Prerequisites

- Login credentials for a Bot Runner user that has permission to view the bots you want to deploy.
- The path to the folder that contains the bot you want to find.

This task shows you how to find the bot id by navigating the Enterprise Control Room user interface.

You can also use the Repository Management API to search a folder in the Enterprise Control Room repository for a list of bots and their ids.

## Procedure

1. Log on as a Bot Runner user that has permissions to view the bots you want to find.
2. Go to BOTS > My Bots > Bots > <your folder>.
3. In the NAME column, click the name of the bot you want to deploy.
4. Look in the Enterprise Control Room URL to see the bot id.

```
<your_control_room_url>/#/bots/repository/public/taskbots/57911/view
```

In this example, the bot id is 57911.

### Related tasks

[Bot deploy task](#)

[How to find a user's id](#)

[How to find a device pool id](#)

## 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 details about files, folders, and bots](#)

Request details about bots, folders, and files by searching by names, relative paths, and IDs in the Enterprise Control Room where they are stored.

- [Request device details](#)

Use this API to retrieve a list of devices that are available for bot deployment.

- [Request bot deployment status](#)

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.

## Request details about files, folders, and bots

Request details about bots, folders, and files by searching by names, relative paths, and IDs in the Enterprise Control Room where they are stored.

## Prerequisites

Use the bot names, folder paths, and IDs to retrieve detailed information.

### Roles and license

You have to authenticate as a user that has a Bot runner (Run time with TaskBots and MetaBots) license.

- URL:

```
http://<your_control_room_url>/v2/repository/file/list
```

- Method: POST

Supported filterable fields:

### path

This example searches for the string Finance in the path parameter. This search is not case-sensitive. It finds Finance or finance.

- Field: path
- Type: string

```
{
  "filter": {
    "operator": "substring",
    "value": "Finance",
    "field": "path"
  }
}
```

### name

Retrieves all the bots with HR in their name. For example, Automation Anywhere\My Tasks\Bots\HR-daily.atmx

- Field: name
- Type: string

```
{
  "filter": {
```

```

        "operator": "substring",
        "field": "name",
        "value": "HR"
    }
}

```

**directory**

The value `false` will retrieve all files (and not directories); if the value is `true`, then it will return all the directories.

- Field: directory
- Type: boolean

```

{
  "filter": {
    "operator": "eq",
    "field": "directory",
    "value": "false"
  }
}

```

**parentId**

This will retrieve all the bots or files with parentid as 7.

- Field: parentid
- Type: long

```

{
  "filter": {
    "operator": "eq",
    "field": "parentid",
    "value": "7"
  }
}

```

**lastModified**

This will retrieve all the bots or files that were last modified at that date-time.

- Field: lastModified
- Type: date-time

```
{
  "filter": {
    "operator": "gt",
    "field": "lastModified",
    "value": "2020-01-07T18:00:00Z"
  }
}
```

Use the following fields to filter the response:

**name:** The partial or full name of a bot. You can search on the exact name (eq) or a text string (substring) that is contained in the bot name.

The following request returns a detailed list of all the bots that are in any folder that contains `Finance` in the folder path.

## Procedure

1. Use the POST method to generate an authentication JSON Web Token. Add the generated authentication token to the request header.  
[Authentication API](#)
2. Enter the URL for the API:

```
POST
http://192.0.2.0/v2/repository/file/list
```

3. Select the POST method.
4. Use the substring "finance" in the request body to search for folder paths that contain the string.

```
{
  "filter": {
    "operator": "substring",
    "field": "path",
    "value": "finance"
  }
}
```

5. Send the request.

The id in the following response is the unique identifier for the bot. In this response, bot id as 12 is listed.

Response body:

```
{
  "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](#).

## Request device details

Use this API to retrieve a list of devices that are available for bot deployment.

## Prerequisites

### 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.

## Procedure

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"  
  }]  
}
```

## Next steps

You can use the device IDs received in the response to deploy the bots on Bot Runners.

### Request bot deployment status

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.

### Prerequisites

Ensure you have the following:

- The id of a specific bot to track its progress.
- You need to authenticate as a user with an Unattended bot runner license.
- The endpoint URLs:
  - <your\_control\_room\_url>/v2/activity/list
  - <your\_control\_room\_url>/v2/repository/file/list
  - <your\_control\_room\_url>/v1/usermanagement/users/list

You can use deploymentId, userId, fileId, and deviceId to track the deployment status of a specific bot.

- If you want to get a list of file IDs use the endpoint URL: <your\_control\_room\_url>/v2/repository/file/list

### [Request details about files, folders, and bots](#)

- If you want to get a list of user IDs use the endpoint URL: <your\_control\_room\_url>/v1/usermanagement/users/list

### [Search for users](#)

## Procedure

1. Generate an authentication token and add to the request header.  
[Authentication API](#)
2. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/activity/list. Enter the parameters in the request body for the bot of which you want to get the activity details. For example:

```
POST https://192.0.2.0/v2/activity/list
```

In this example, use fileId as 16985 and deviceId as 285 to filter your results.

Request body:

```
{
  "filter": {
```

```

"operator": "and",
"operands": [
{
    "operator": "eq",
    "value": "285",
    "field": "deviceId"
},
{
    "operator": "eq",
    "value": "16985",
    "field": "fileId"
}
]
}
}

```

3. Send the request.

When the request is successful, the activity status for the bots with the fileId of 16985 on the device with the deviceld of 285 is returned in the response body. The status of the bot deployment is COMPLETED.

In this example,

Response body:

```

{
    "page": {
        "offset": 0,
        "total": 31296,
        "totalFilter": 12
    },
    "list": [
{
    "id": "7d531a3e-a9c2-4ae5-87c1-174c95804504",
    "automationName": "Finance-RPA-Run",
    "fileName": "recorder_Recorder_2.0.9-20200929-154358",
    "filePath": "Automation Anywhere\\System\\recorder_Recorder_2.0.9-20200929-154358",
    "type": "TASK",
    "startDateTime": "2020-09-30T07:30:21Z",
}
]
}

```

```
"endDateTime": "2020-09-30T07:46:01Z",
"command": "",
"status": "COMPLETED",
"progress": 100,
"automationId": "16",
"userId": "1516",
"deviceId": "285",
"currentLine": 1,
"totalLines": 1,
"fileId": "16985",
"modifiedBy": "1516",
"createdBy": "1516",
"modifiedOn": "2020-09-30T07:46:01.643800Z",
"createdOn": "2020-09-30T07:30:26.288529Z",
"deploymentId": "c164e447-ae5b-4dac-910d-731620362bd5",
"queueName": "",
"queueId": "",
"usingRdp": false,
"message": "",
"canManage": true,
"deviceName": "AABRD0132",
"userName": "janedoe",
"botOutVariables": {
    "values": {

    }
},
"tenantUuid": "01fbb3fc-e11e-e58d-61b2-2fa1f1545b2b"
},
{
    "id": "c477f0b8-9eec-4441-89ef-e5fcecef5c4",
    "automationName": "deploy_20.05.01.17.08.35_jdoe_API",
    "fileName": "recorder_Recorder_2.0.9-20200929-154358",
    "filePath": "Automation Anywhere\\System\\recorder_Recorder_2.0.9-20200929-154358",
    "type": "TASK",
```

```
"startDateTime": "2020-09-30T07:47:08Z",
"endDateTime": "2020-09-30T07:47:52Z",
"command": "",
"status": "COMPLETED",
"progress": 100,
"automationId": "17",
"userId": "1516",
"deviceId": "285",
"currentLine": 1,
"totalLines": 1,
"fileId": "16985",
"modifiedBy": "1516",
"createdBy": "1516",
"modifiedOn": "2020-09-30T07:47:53.238791Z",
"createdOn": "2020-09-30T07:47:10.536940Z",
"deploymentId": "d0322179-d6d5-4e18-8ba9-0985adf99fb1",
"queueName": "",
"queueId": "",
"usingRdp": false,
"message": "",
"canManage": true,
"deviceName": "AABRD0132",
"userName": "janedoe",
"botOutVariables": {
    "values": {
        }
    },
"tenantUuid": "01fbb3fc-e11e-e58d-61b2-2faf1545b2b"
}
]
}
```

The REST API responds to each request with an HTTP response code. For details about the response codes, see [API response codes](#).

## 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. They must have the following permissions and licenses:

- Export bots
- Import bots
- Check in or Check out permission to the necessary folders
- View and Manage packages
- Bot Creator license

Dependent files and actions are automatically included.

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.

The BLM export API searches a bot that has to be exported from the source Enterprise Control Room using a file ID associated with the bot. The response returns the download file ID using which the exported file is downloaded in zip format. The BLM import API imports the TaskBot in the target Enterprise Control Room by uploading the zip file.

### API endpoints

- Export:
  - <your\_control\_room\_url>/v2/blm/export
  - <your\_control\_room\_url>/v2/blm/status/{requestId}
  - <your\_control\_room\_url>/v2/blm/download/{download fileId}
- Import:
  - <your\_control\_room\_url>/v2/blm/import
  - <your\_control\_room\_url>/v2/blm/status/{requestId}
- [Export files using API](#)  
You can export bots with their dependent files using the Export API.
- [Import files using API](#)  
You can import bots with their dependent files using the Import API.

Related concepts

[Bot Lifecycle Management](#)

### Export files using API

You can export bots with their dependent files using the Export API.

## Prerequisites

- You must have Export bots, View package, and Check in or Check out permissions to the required folders.
- An authentication token for a user registered in the Enterprise Control Room.

### [Authentication API](#)

- A file ID of the bot you want to export from the public folder.

### [List workspaces folders and files](#)

Note: Users can only view the folders and subfolders they have permissions to access.

- The following API URLs:
  - <your\_control\_room\_url>/v2/blm/export: To export repository bots
  - <your\_control\_room\_url>/v2/blm/status/{requestId}: To get export status by request ID
  - <your\_control\_room\_url>/v2/blm/download/{download fileId}: To download the exported bot

## Procedure

1. Use the POST method to generate an authentication JSON Web Token.

### [Authentication API](#)

The BLM Export API uses the authentication token that is obtained using the Authentication API. The authentication token has to be passed on as one of the header inputs to the BLM Export API.

2. Search for one or more file IDs of the bot you want to export.

### [List workspaces folders and files](#)

3. Use the POST method and URL: <your\_control\_room\_url>/v2/blm/export.

Enter the following parameters in the request body:

- **name**: This is a string. Enter the export filename.
- **fileIds**: This is a numeric value. Enter one or more file IDs of the bot you want to export.
- **includePackages**: This is a Boolean value. Enter either **true** or **false**. Enter **true** if the export file should contain packages required for bots.
- **archivePassword**: This is a string and is optional. Enter the export archive password.

Request body:

```
{
  "name": "export-docs",
  "fileIds": [
    2197
  ],
  "includePackages": true
}
```

4. Send the request.

- In the REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body returns the `requestId`.

Response body:

```
{
  "requestId": "987c0de3-b158-4e71-975e-27d10b9a83fb"
}
```

5. Use the GET method and enter the `requestId` in the URL: <your\_control\_room\_url>/v2/blm/status/{requestId}

```
https://192.0.2.0/v2/blm/status/987c0de3-b158-4e71-975e-27d10b9a83fb
```

6. Send the request.

- In the REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body returns the `status` and `download fileId`.

Response body:

```
{
  "requestId": "987c0de3-b158-4e71-975e-27d10b9a83fb",
  "type": "EXPORT",
  "status": "COMPLETED",
  "downloadFileName": "export-docs",
  "download fileId": "ZXhwB3J0LWRvY3M=",
  "errorMessage": ""
}
```

7. Use the GET method and enter the `download fileId` in the URL: <your\_control\_room\_url>/v2/blm/download/{download fileId}

```
https://192.0.2.0/v2/blm/download/ZXhwB3J0LWRvY3M=
```

8. Send the request.

- In the REST Client, click Send and Download.
- In the Swagger interface, click Execute.

The dialog box appears. Browse the path and save the exported package in zip file format.

## Next steps

Import the exported file in the private folder of the target Enterprise Control Room.

Related tasks

[Export bots](#)

## Import files using API

You can import bots with their dependent files using the Import API.

## Prerequisites

- You must have Import bots, Manage package, and Check in permissions to the necessary folders and Bot Creator license.
- An authentication token for a user registered in the Enterprise Control Room.

### [Authentication API](#)

- The following API URLs:
  - <your\_control\_room\_url>/v2/blm/import: To import repository bot
  - <your\_control\_room\_url>/v2/blm/status/{requestId}: To get import status by request ID

## Procedure

1. Use the POST method to generate an authentication JSON Web Token.

### [Authentication API](#)

The BLM Import API uses the authentication token that is obtained using the Authentication API. The authentication token has to be passed on as one of the header inputs to the BLM Import API.

2. Use the POST method and URL: <your\_control\_room\_url>/v2/blm/import.

Provide the following parameters for the request header.

- **upload:** Choose the required zip file that you want to import in your Enterprise Control Room.
- **actionIfExisting:** Select either the SKIP or OVERWRITE option if the file you are importing already exists.
- **archivePassword:** This is a string and is optional. Enter the archive password.

Request body:

```
{
  "upload": "docs-blm.zip",
  "actionIfExisting": "OVERWRITE"
}
```

3. Send the request.

- In the REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body returns `requestId`.

Response body:

```
{
  "requestId": "eafef543-2d7a-47f5-81d0-490d09dd68d2"
}
```

4. Use the GET method and enter the `requestId` in the URL: <your\_control\_room\_url>/v2/blm/status/{requestId}

Request body:

```
https://192.0.2.0/v2/blm/status/eafef543-2d7a-47f5-81d0-490d09dd68d2
```

5. Send the request.

- In the REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body returns the status.

Response body:

```
{
  "requestId": "fa4b0c56-fab8-42ef-8d96-fc6b53e1cbba",
  "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.

Related tasks

[Import bots](#)

## Credential Vault API

As an Enterprise Control Room user with Manage my credentials and lockers role permissions, you have the option to use the Credential Vault API to manage your attributes, credentials, keys, lockers, and Credential Vault mode 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.

## 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](#)

List all available device pools in your Enterprise Control Room, or filter the list by the name of the device pool.

- [Details of device pool by ID](#)

Retrieve the details of a specific device pool by its numeric identifier (ID).

- [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.

### List device pools

List all available device pools in your Enterprise Control Room, or filter the list by the name of the device pool.

### Prerequisites

Users must have the following permission to use this API:

- User permission:

DEVICES

View and manage ALL device(s): View and manage all the devices, including devices registered by other users.

- An authentication token for a user with the necessary permission.

This task searches for all device pools that contain the string finance in the name.

### Procedure

1. Add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.  
[Authentication API](#)
2. Use the POST method for this API.
3. Enter a request body.

```
{
  "filter": {
    "operator": "substring",
    "field": "name",
    "value": "finance"
  }
}
```

4. Send the request.
    - In a REST client, click SEND
    - In Swagger, click Execute
- 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.

[Details of device pool by ID](#)

## Details of device pool by ID

Retrieve the details of a specific device pool by its numeric identifier (ID).

## Prerequisites

Ensure you have the following to use this API:

- User permission:

### DEVICES

View and manage ALL device(s): View and manage all the devices, including devices registers by other users.

- An authentication token for a user with the necessary permission.
- 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.

## Procedure

1. Add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.  
[Authentication API](#)
2. Use the GET method for this request. Enter the device pool ID in the URL.  
In this example, the device pool ID is 27.

```
<your_control_room_url>/v2/devices/pools/27
```

3. Send the request.
  - In a REST client, click SEND
  - In Swagger, click Execute

Response body:

```
{
  "id": "27",
  "name": "finance-device-pool",
  "description": "Finance department device pool",
  "automationScheme": "ROUND_ROBIN",
  "status": "CONNECTED",
  "timeSlice": "5",
  "timeSliceUnit": "MINUTES",
  "deviceIds": [
    "10",
    "11",
    "12",
    "13",
    "14",
    "15",
    "16",
    "17",
    "18",
    "19"
  ]
}
```

```
"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 poolId for bot deployment.

#### [Bot deploy task](#)

#### name

This is the user-defined name for the device pool. Filter the device pool name using filters in the list device pools task.

#### [List device pools](#)

#### 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.

## 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.

## Prerequisites

Ensure you have the following:

- AAE\_Pool\_Admin role and View and manage ALL device(s) permission
- Endpoint URLs:
  - <your\_control\_room\_url>/v2/devices/pools
  - <your\_control\_room\_url>/v2/devices/list

## Procedure

1. Use the POST method and endpoint URL: <your\_control\_room\_url>/v2/devices/pools. Enter values for the parameters such as name of the device pool, deviceIds, automationScheme, ownerIds, and consumerIds . If you want to search or get a list of all the available deviceIds, use the following endpoint URL: <your\_control\_room\_url>/v2/devices/list

### [Request device details](#)

For example:

```
POST https://192.0.2.0/v2/devices/pools
```

In this example, the following parameters are entered in the request body:

- name: Device pool name as Finance-device-pool
- deviceIds: IDs of the devices that you want in the device pool
- automationScheme: ROUND\_ROBIN
- ownerIds: IDs of the users that you want to have as device pool owners
- consumerIds: IDs of the roles that you want to add as device pool consumers

Request body:

```
{
  "name": "Finance-device-pool",
  "description": "Pool for Finance RPA",
  "deviceIds": [
    "1",
    "10"
  ],
  "automationScheme": "ROUND_ROBIN",
  "ownerIds": [
```

```
        "1",
        "24",
        "26"
    ],
    "consumerIds": [
        "21",
        "22"
    ]
}
```

## 2. 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 details about the response codes, see [API response codes](#).

## Next steps

[Run bot with queue API](#)

## 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](#).

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.

### Related reference

[Enterprise A2019 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.

## Procedure

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](#)

- **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](#)

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](#).

## Next steps

If the `controlRoomLicenseServerSyncStatus` parameter returns `False`, use the Sync endpoint to update the license allocations and expiration date from the license server.

## Migration APIs

The Migration APIs allow users with the appropriate migration permission to view or manage bot migration from 11.x to A2019, including starting the migration of bots and retrieving details about migrations.

- Ensure that you complete the prerequisites before migrating 11.x bots to A2019. See [Prerequisite tasks for migrating bots](#)
- Access the Enterprise Control Room APIs included with the Enterprise A2019 product:

`http://<your_control_room_url>/swagger`

- [Start migration](#)

The Migration API enables users to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 11.x to A2019.

- [Migration results list](#)

List the overall migration results for each migration you run. Filter by selected fields to get the specific results you need.

- [Migration status results by id](#)

List bot migration results by a unique numeric identifier, `{id}`, and filter the results by selected fields.

- [Migration action mapping results](#)

List action mapping results for bots by unique numeric identifiers for the migration `{id}` and the journal `{journalid}`, and filter the results by selected fields.

- [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.

## Start migration

The Migration API enables users to convert and migrate bots (TaskBots and MetaBots) created using the Enterprise client version 11.x to A2019.

## Prerequisites

User with a runtime license and the following [permissions](#) can start a migration.

**BOTS**

- Run my bot
- Export bots
- Import bots
- Create bots
- Rename folders

**DEVICES**

- Register device
- View and Manage ALL device(s)
- Delete the devices(s)

**AUDIT LOG**

- View everyone's audit log actions

**ADMINISTRATION**

- Allow a bot-runner user to run migrations

- The folderIds that you want to migrate.
- The userIds to run as for the migration.

```
{
  "id": 0,
  "name": "string",
  "description": "string",
  "overwriteBots": true,
  "botIds": [
    0
  ],
  "userIds": [
    0
  ],
  "folderIds": [
    0
  ],
  "includeChildFolders": true
}
```

**Procedure**

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. This request is structured to migrate a single bot, botIds 74, and run as user 18.

```
{
  "name": "Docs Test Migration",
  "description": "docs test",
  "overwrtiteBots": true,
  "botIds": [
    74
  ],
  "userIds": [
    18
  ]
}
```

4. Send the request.
  - In Swagger, click Execute.
  - In a REST client, click SEND

The successful response includes a 200 success code and an empty body.

```
{ }
```

You can also migrate all the bots from a sub-folder.

#### [Migrate all bots in a sub-folder](#)

Migrate all the bots contained in a sub-folder in your Enterprise Control Room repository.

## Next steps

You can view the status of the migration using the [Migration results list API](#).

## Migrate all bots in a sub-folder

Migrate all the bots contained in a sub-folder in your Enterprise Control Room repository.

## Prerequisites

Find the folder {id} you want to migrate

[List workspaces folders and files](#) 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 migration request body.

userIds for one or more user 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](#)

Authentication token for a user with migration permission

Request an authentication token using the login for a user that has the administrative permission to view and manage migrations. [Authentication API](#)

## Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. This request starts a migration for all the bots contained in the sub-folder with the folderIds equal to 7. The user is an unattended Bot Runner with the userIds equal to 18.

```
{  
    "name": "Follow a convention that is meaningful and easy to search.",  
    "description": "Add a meaningful description.",  
    "overwtiteBots": true,  
    "userIds": [  
        18  
    ],  
    "folderIds": [  
        7  
    ],  
    "includeChildFolders": true  
}
```

4. Send the request.
  - In Swagger, click Execute.
  - In a REST client, click SEND

The successful response includes a 200 success code and an empty body.

```
{ }
```

## Next steps

You can view the status of the migration using the [Migration results list API](#).

### Migration results list

List the overall migration results for each migration you run. Filter by selected fields to get the specific results you need.

### Prerequisites

- Administrator or user with View migration permission is required to view details about migrations.
- Access to the Automation Anywhere Migration API.

```
<your_control_room_url>/v3/migration/list
```

- Any values for parameters you want to use to filter and limit your search.

Supported filterable fields:

createdBy

The unique numeric identifier of the user who started the migration.

```
{
  "filter": {
    "field": "createdBy",
    "value": 6,
    "operator": "eq"
  }
}
```

numTotal

The total number of bots migrated in a specific migration, including bots successfully migrated, skipped, and failed.

```
{
  "filter": {
    "field": "numTotal",
    "value": 0,
    "operator": "gt"
  }
}
```

Filter on the numeric values of these similar fields.

numFailed

The number of bots that failed to be migrated in a specific migration.

numSkipped

Skipped bots include those bots that already exist, and the user has chosen not to overwrite existing bots ("overwriteBots": false).

numSuccess

The number of bots successfully migrated in a specific migration.

updatedBy

The numeric identifier of the user who started the migration.

```
{
  "filter": {
    "field": "updatedBy",
    "value": 6,
    "operator": "eq"
  }
}
```

**updatedOn**

The date and time when the migration was started.

```
{
  "filter": {
    "field": "updatedOn",
    "value": "2020-04-07T00:42:08.967Z",
    "operator": "eq"
  }
}
```

## Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. Enter a request body. This request searches for migrations that contain the string doc in the name that was started between the specified dates.

```
{
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "gt",
        "field": "updatedOn",
        "value": "2020-04-08T00:00:00.001Z"
      },
      {
        "operator": "substring",
        "field": "name",
        "value": "doc"
      }
    ]
}
```

```

        "value": "doc"
    },
    {
        "operator": "lt",
        "field": "updatedOn",
        "value": "2020-04-13T00:00:00.001Z"
    }
]
}
}

```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND

The response for this request returned 3 of 34 migrations.

Response body:

Note: There are some response fields that are not used for 11.x migration:

- duration: is a legacy field that is no longer used for migration.
- migrationType: is used for 10.x migrations only. It is not used for 11.x migration.

```

{
    "page": {
        "offset": 0,
        "total": 34,
        "totalFilter": 3
    },
    "list": [
        {
            "id": 21,
            "name": "Docs Test Migration",
            "startTime": "2020-04-09T21:09:25.590Z",
            "endTime": "2020-04-09T22:41:49.313Z",
            "createdBy": 17,
            "duration": "5543s",
            "numSuccess": 0,
            "numFailed": 0,
            "numSkipped": 0,
            "numTotal": 1,
        }
    ]
}

```

```
        "status": "IN_PROGRESS",
        "updatedOn": "2020-04-09T21:09:25.590Z",
        "updatedBy": 17,
        "durationMillis": 5543723,
        "migrationType": "BOT"
    },
    {
        "id": 22,
        "name": "Docs Test Migration 02",
        "startTime": "2020-04-09T21:22:32.587Z",
        "endTime": "2020-04-09T22:41:49.313Z",
        "createdBy": 17,
        "duration": "4756s",
        "numSuccess": 0,
        "numFailed": 0,
        "numSkipped": 0,
        "numTotal": 1,
        "status": "IN_PROGRESS",
        "updatedOn": "2020-04-09T21:22:32.587Z",
        "updatedBy": 17,
        "durationMillis": 4756726,
        "migrationType": "BOT"
    },
    {
        "id": 24,
        "name": "Docs Test 03",
        "startTime": "2020-04-09T22:31:27.617Z",
        "endTime": "2020-04-09T22:41:49.317Z",
        "createdBy": 17,
        "duration": "621s",
        "numSuccess": 211,
        "numFailed": 0,
        "numSkipped": 0,
        "numTotal": 211,
        "status": "SUCCESSFUL",
        "updatedOn": "2020-04-09T22:31:27.617Z",
```

```

        "updatedBy": 17,
        "durationMillis": 621700,
        "migrationType": "BOT"
    }
]
}

```

## Next steps

To view details about a specific migration, enter a specific migration id in the [Migration status results by id API](#).

### Migration status results by id

List bot migration results by a unique numeric identifier, {id}, and filter the results by selected fields.

#### Prerequisites

- Administrator View migration permission to be able to view details about a migration.
- Access to the Automation Anywhere Migration API.

```
<your_control_room_url>/v3/migration/{id}/results/list
```

- Any values for parameters you want to use to filter and limit your search.
- The numeric identifier, {id}, for the migration you want to view.

Supported filterable fields:

reason

```

{
  "filter": {
    "field": "reason",
    "operator": "substring",
    "value": "failed"
  }
}

```

sourceName

```
{
  "filter": {
```

```
        "field": "sourceName",
        "operator": "substring",
        "value": "Box01"
    }
}
```

sourcePath

```
{
  "filter": {
    "field": "sourcePath",
    "operator": "substring",
    "value": "My Metabots"
  }
}
```

status

```
{
  "filter": {
    "field": "status",
    "operator": "eq",
    "value": "FAILED"
  }
}
```

- FAILED
- SUCCESS
- SKIPPED

targetName

```
{
  "filter": {
    "field": "targetName",
    "operator": "substring",
    "value": "dep01"
  }
}
```

targetPath

```
{
  "filter": {
    "field": "targetPath",
    "operator": "substring",
    "value": "dep01"
  }
}
```

## Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. Enter the numeric identifier for the migration you want to view the details about. In this example we are viewing the migration with the id of 32.

```
<your_control_room_url>/v3/migration/32/results/list
```

4. Create a request to find the results you want to see. This filter searches for a string in the name of the migrated bot.

```
{
  "filter": {
    "operator": "substring",
    "field": "targetName",
    "value": "logic-launch"
  }
}
```

5. Send the request.
  - In Swagger, click Execute.
  - In a REST client, click SEND

The response for this request returned 1 out of 3 responses for bot migration details.

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"
    }
  ]
}

```

## Next steps

### Migration action mapping results

List action mapping results for bots by unique numeric identifiers for the migration {id} and the journal {journalid}, and filter the results by selected fields.

### Prerequisites

- Administrator View migration permission to be able to view details about a migration.
- Access to the Automation Anywhere Migration API.

```
<your_control_room_url>/v3/migration/{id}/results/list
```

- Any values for parameters you want to use to filter and limit your search.

- The numeric identifier, {id}, for the migration you want to view.
- The numeric value for the {journalid} associated with the migration identifier.

```
/v3/migration/{id}/journal/{journalid}/actionmappings/list
```

Note: [How to find a migration journalid](#)

Supported filterable fields:

reason

Filter on a string within the reason field to return specific journal entries.

```
{
  "filter": {
    "field": "reason",
    "operator": "substring",
    "value": "not yet supported"
  }
}
```

remarks

Filter on a string within the remarks field to return specific journal entries.

```
{
  "filter": {
    "field": "remarks",
    "operator": "substring",
    "value": "not yet supported"
  }
}
```

sourceAction

Filter for specific actions used the bot being migrated.

```
{
  "filter": {
    "field": "sourceAction",
    "operator": "substring",
    "value": "OpenSpreadsheet"
  }
}
```

**targetAction**

Filter for specific actions used the bot target migrated bot.

```
{
  "filter": {
    "field": "targetAction",
    "operator": "substring",
    "value": "OpenSpreadsheet"
  }
}
```

**Procedure**

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. Enter the migration id and journal id in the request URL>

```
/v3/migration/8/journal/8/actionmappings/list
```

3. POST is the method used for this API.
4. Request body.

```
{
  "filter": {
    "field": "reason",
    "operator": "substring",
    "value": "not yet supported"
  }
}
```

5. Send the request.
  - In Swagger, click Execute.
  - In a REST client, click SEND

The response for this request returned 1 of 10 migration list objects results.

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": ""
        }
    ]
}

```

- [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.

## 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 this response. The id in each list object us the journalid. In this example, there are two journal identifiers, 30 and 31, for the migration with the 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": ""
}
}
```

```
    ]  
}
```

This is how you would enter 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](#).
- 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.
  - [Connecting 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.
  - [Validating master key and repository path](#)  
Use this API to validate the Credential Vault master key and the repository path.
  - [Initiating 10.x data migration process](#)  
Use this API to start the 10.x data migration.
  - [Retrieving migrated roles](#)  
Use this API to retrieve 10.x roles that are copied to the A2019 database.
  - [Retrieving migrated users](#)  
Use this API to retrieve 10.x database users that are copied to the A2019 database.
  - [Retrieving migrated credentials](#)  
Use this API to retrieve 10.x database credentials that are copied to the A2019 database.
  - [Retrieving migrated bots](#)  
Use this API to retrieve a list of 10.x migrated bots that are copied to the A2019 database.
  - [Retrieving migrated schedules](#)  
Use this API to retrieve a list of 10.x migrated schedules that are copied to the A2019 database.

## Connecting 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.

## Prerequisites

- Review the prerequisites before migrating bots to A2019.

### [Prerequisite tasks for migrating bots](#)

- You must have an admin role or the Manage Migration permission to validate connection parameters and connect to the 10.x database.
- Access the Enterprise Control Room APIs included with the Enterprise A2019 product:

```
http://<your_control_room_url>/swagger
```

- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

### [Authentication API](#)

The default timeout for an authentication token is 20 minutes. After that, you will require a new token.

## Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/connection
```

2. Use the request structure:

```
{
    "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       |

| Parameter          | Required | Type    | Description                                                                                                                            |
|--------------------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------|
| password           | Yes      | String  | Password to connect to the database                                                                                                    |
| integratedSecurity | Yes      | Boolean | Set this to <code>true</code> if you want to use Windows authentication. The default is <code>false</code> .                           |
| encrypt            | Yes      | Boolean | Set this to <code>true</code> if you want to use a secure connection to the source database. The default value is <code>false</code> . |

3. Send the request.

In Swagger, click Execute.

Response structure

```
{ }
```

Return codes

| Status code | HTTP name               | Description                                                                                             |
|-------------|-------------------------|---------------------------------------------------------------------------------------------------------|
| 200         | OK                      | Success                                                                                                 |
| 204         | No content              | Success                                                                                                 |
| 400         | Bad request             | Request URL or request parameters are incorrect.                                                        |
| 401         | Authentication required | Provide authentication details.                                                                         |
| 403         | Unauthorized access     | The operation is not authorized.                                                                        |
| 500         | Internal server error   | Indicates that the server encountered a problem. Clear the cookies and cache, and then reload the page. |

## Next steps

[Validating master key and repository path](#)

# Validating master key and repository path

Use this API to validate the Credential Vault master key and the repository path.

## Prerequisites

- You must have an admin role or the Manage Migration permission to validate the master key and the repository path.

- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

#### [Authentication API](#)

- Complete this step [Connecting to 10.x database](#) before executing this API.

## Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/masterkey
```

2. Use the request structure:

```
{
  "privateKey": "<CV master key value>",
  "repoPath": "C:\\Migration\\10X\\A2019.14\\Automation Anywhere Server
Files"
}
```

If you are not able to get a response, in the repoPath, add an additional backslash in the path 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. This is available for configuration during the initial Enterprise Control Room setup. |
| repoPath   | Yes      | String | The shared repository path where the Enterprise Control Room 10.x repository is located.                                                  |

3. Send the request.

In Swagger, click Execute.

Response structure

```
{ }
```

## Next steps

[Initiate the 10.x data migration process](#)

# Initiating 10.x data migration process

Use this API to start the 10.x data migration.

## Prerequisites

- You must have an admin role or the Manage Migration permission to start the 10.x data migration.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

### [Authentication API](#)

- Complete this step [Validating master key and repository path](#) before executing this API.

## Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/start
```

2. Use the request structure:

```
{
  "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. |

3. Send the request.

In Swagger, click Execute.

Response structure

```
{
  "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                                         |
| migrationType | Indicates the data migration type: Role or Bot<br>This is used for 10.x migration only. |
| entities      | List of migration entities                                                              |

## Next steps

[Retrieve a list of migration roles](#)

## Retrieving migrated roles

Use this API to retrieve 10.x roles that are copied to the A2019 database.

### Prerequisites

- You must have an admin role or the View Migration permission to retrieve migrated roles.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

[Authentication API](#)

### Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/{migrationId}/roles/list
```

2. Use the ID from the API response body as the migrationId.  
See [Initiating 10.x data migration process](#).
3. Use the request structure:

```
{
  "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.

In Swagger, click Execute.

Response structure

```
{
  "page": {
    "offset": 0,
    "total": 9,
    "totalFilter": 9
  },
  "list": [
    {
      "id": 1,
      "type": "ROLE",
      "name": "System"
    }
  ]
}
```

```

    "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. |

| Parameter  | Description                                                                    |
|------------|--------------------------------------------------------------------------------|
| type       | The migration type                                                             |
| sourceld   | 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.             |
| reason     | The reason why the migration failed                                            |
| targetPath | The migrated bot file location<br>It is only applicable for the bot migration. |

## Next steps

[Retrieve a list of migrated users](#)

## Retrieving migrated users

Use this API to retrieve 10.x database users that are copied to the A2019 database.

### Prerequisites

- You must have an admin role or the View Migration permission to retrieve migrated users.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

[Authentication API](#)

### Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/{migrationId}/users/list
```

2. Enter the migration ID.
3. Use the request structure:

```
{
  "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.

In Swagger, click Execute.

## Response structure

```
{
    "page": {
        "offset": 0,
        "total": 5,
        "totalFilter": 5
    },
    "list": [
        {
            "id": 10,
            "type": "USER",
            "sourceId": "1",
            "name": "John Doe"
        }
    ]
}
```

```

    "targetId": 11,
    "name": "admin_1",
    "status": "SUCCESS",
    "reason": "The user admin has been renamed to admin_1 as the user wi
    th 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                                                 |
| sourceld  | 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.                               |

| Parameter  | Description                                                                |
|------------|----------------------------------------------------------------------------|
| targetPath | The migrated bot file location<br>It is only applicable for bot migration. |

## Next steps

[Retrieve a list of migrated credentials](#)

## Retrieving migrated credentials

Use this API to retrieve 10.x database credentials that are copied to the A2019 database.

### Prerequisites

- You must have an admin role or the View Migration permission to retrieve migrated credentials.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

[Authentication API](#)

### Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/{migrationId}/credentials
/list
```

2. Enter the migration ID.
3. Use the request structure:

```
{
  "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.

In Swagger, click Execute.

Response structure

```
{
  "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                                                             |
| sourceld   | 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. |

## Next steps

[Retrieve a list of migrated bots](#)

## Retrieving migrated bots

Use this API to retrieve a list of 10.x migrated bots that are copied to the A2019 database.

## Prerequisites

- You must have an admin role or the View Migration permission to retrieve migrated bots.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

[Authentication API](#)

## Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/{migrationId}/bots/list
```

2. Enter the migration ID.
3. Use the request structure:

```
{
  "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.

In Swagger, click Execute.

Response structure

```
{  
  "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                                                 |
| sourceld   | 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                                     |

#### Next steps

[Retrieve a list of migrated schedules](#)

## Retrieving migrated schedules

Use this API to retrieve a list of 10.x migrated schedules that are copied to the A2019 database.

#### Prerequisites

- You must have an admin role or the View Migration permission to retrieve migrated schedules.
- Before using any API, add an authentication token to the request header. Use the Authentication API to generate a JSON Web Token.

[Authentication API](#)

## Procedure

1. Use the HTTP request syntax (URL):

```
POST http://<your_control_room_url>/v2/migration/{migrationId}/schedules/list
```

2. Enter the migration ID.
3. Use the request structure:

```
{
  "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.  
In Swagger, click Execute.

### Response structure

```
{  
  "page": {  
    "offset": 0,  
    "total": 7,  
    "totalFilter": 7  
  },  
  "list": [  
    {  
      "id": 1173,  
      "type": "SCEDULE",  
      "sourceId": "3",  
      "targetId": 2,  
      "name": "Monthly",  
      "status": "SUCCESS",  
      "reason": "",  
      "targetPath": ""  
    },  
    {  
      "id": 1174,  
      "type": "SCEDULE",  
      "sourceId": "5",  
      "targetId": 3,  
      "name": "alternatemonths",  
      "status": "SUCCESS",  
      "reason": "",  
      "targetPath": ""  
    },  
    .....  
    {  
      "id": 1179,  
      "type": "SCEDULE",  
      "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                                                             |
| sourceld   | 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. |

## Repository Management API

The Repository management API is a role based access API that returns information for folders and files that you have permission to view 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.

The Repository management API searches an Enterprise Control Room repository using a folder ID associated with a user. The response returns the sub-folders contained in that folder. Folder access is based on the roles and licenses that are assigned to a user.

Bot developers have access to the folders where their bots are stored. An administrator, however, might have access to the folders in the root directories and its sub-folders.

Locate your folder IDs by logging in to your Enterprise Control Room and looking at the URL for the folder you want to search.

```
<your_control_room_url>/#/bots/repository/public/folders/7
```

In this example, 7 is the folder identification number for the sub-folder "My Tasks." The parent to this folder is named "Bots" with a numeric identifier of 923.

- [List folders by id](#)

List and filter files under a specific parent folder by using the parent folder id.

- [List workspaces folders and files](#)

Search in the Enterprise Control Room private or public repository for folders and files, and use filters to find exactly the files and folders you need.

### List folders by id

List and filter files under a specific parent folder by using the parent folder id.

### Prerequisites

- You need the numeric ID for the top level folder you want to search.

- An [authentication token](#) for a user registered in the Enterprise Control Room.

Note: Users can only view the folders and sub-folders they have permissions to access.

In the examples used for this task, the top-level public folder identification number is 2. We are searching for sub-folders that contain the string "doc." The structure of this request limits the query to find sub-folders under the parent folder with the identifier of 2.

### Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. The {folderid} is a numeric value. In the request URL, add a {folderid} for the folder you want to search. For this example we are using 2 for the {folderid}.

```
POST https://<your_control_room_url>/v2/repository/public/folders/2/list
```

The following request searches for bots and folders that contain the string finance in the name parameter.

Request body:

```
{
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "substring",
```

```

        "field": "name",
        "value": "finance"
    },
    {
        "operator": "eq",
        "field": "folder",
        "value": "true"
    }
]
}
}

```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND

The response for this request returned 1 out of 329 folders. The request searched the name parameter for the string doc. The name parameter is the name of a sub-folder under the parent folder Bots.

Response body:

```
{
  "page": {
    "offset": 0,
    "total": 329,
    "totalFilter": 1
  },
  "list": [
    {
      "id": "40378",
      "parentId": "2",
      "name": "TS-Docs",
      "path": "Automation Anywhere\\Bots\\TS-Docs",
      "description": "",
      "type": "application/vnd.aa.directory",
      "size": "0",
      "folder": true,
      "folderCount": "0",
      "productionVersion": ""
    }
  ]
}
```

```

    "latestVersion": "",  

    "locked": false,  

    "lockedBy": "0",  

    "createdBy": "2587",  

    "lastModifiedBy": "2587",  

    "lastModified": "2019-12-12T07:01:43.991Z",  

    "workspaceId": "0",  

    "botStatus": "DRAFT",  

    "hasErrors": false,  

    "workspaceType": "UNKNOWN",  

    "metadata": false,  

    "uri": "",  

    "version": "0",  

    "hasTriggers": false  

}  

]  

}

```

## Next steps

The id 40378 from the response is the numeric identifier for the sub-folder TS-Docs . Use the numeric identifiers of bots and folders in API requests, such as the Start migration API.

The Enterprise Control Room user interface URL contains the ids for bots and folders. View a bot or folder to find its numeric identifier.

Bot {id} in the user interface

49502 is the unique numeric identifier for a bot.

```
<your_control_room_url>/#/bots/repository/public/taskbots/49502/view
```

Folder {id} in the user interface

40378 is the unique numeric identifier for a folder.

```
<your_control_room_url>/#/bots/repository/public/folders/40378
```

## List workspaces folders and files

Search in the Enterprise Control Room private or public repository for folders and files, and use filters to find exactly the files and folders you need.

## Prerequisites

- Authentication token for a registered user in the Enterprise Control Room
- The API URL: <your\_control\_room\_url>/v2/repository/workspaces/{workspaceType}/files/list
- Determine whether you want to search the Enterprise Control Room public repository or your private repository.

There are two options for the .../workspaces/{workspaceType}/...

- public: searches all the files and folders included in the public repository of the Enterprise Control Room.
- private: searches only the files and folders that are in a user private repository.

## Procedure

1. Add an authentication token to the request header. Use the [Authentication API](#) to generate a JSON Web Token.
2. POST is the method used for this API.
3. The {workspaceType} in the URL is a string. In the URL, enter public or private for the {WorkspaceType}.  
POST <your\_control\_room\_url>/v2/repository/workspaces/public/files/list
4. Enter the following filter in the request body. This filter searches for only bots with the string "finance" in the name. Reaching for the boolean value of false for the folder field excludes any folders from the search and finds only bots.

```
{
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "substring",
        "field": "name",
        "value": "finance"
      },
      {
        "operator": "eq",
        "field": "folder",
        "value": "false"
      }
    ]
  }
}
```

5. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND

The response for this request returned two out of 1006 possible results. The request searched for any bots with finance in the name.

We excluded folders that might have finance in the path or folder name by setting the search parameter for folders to false. This way the response contains only bots with the string finance in the bot name.

Response body:

```
{  
  "page": {  
    "offset": 0,  
    "total": 1006,  
    "totalFilter": 2  
  },  
  "list": [  
    {  
      "id": "55709",  
      "parentId": "55711",  
      "name": "finance-01",  
      "path": "Automation Anywhere\\Bots\\Finance\\finance-01",  
      "description": "Minor updates",  
      "type": "application/vnd.aa.taskbot",  
      "size": "814",  
      "folder": false,  
      "folderCount": "0",  
      "productionVersion": "",  
      "latestVersion": "53161",  
      "locked": false,  
      "lockedBy": "0",  
      "createdBy": "2538",  
      "lastModifiedBy": "2538",  
      "lastModified": "2020-04-08T16:57:36.753549Z",  
      "workspaceId": "0",  
      "botStatus": "PUBLIC",  
      "hasErrors": false,  
      "workspaceType": "UNKNOWN",  
    }]
```

```
        "metadata": false,  
        "uri": "",  
        "version": "6",  
        "hasTriggers": false  
    },  
    {  
        "id": "56357",  
        "parentId": "55711",  
        "name": "Finance-02",  
        "path": "Automation Anywhere\\Bots\\Finance\\Finance-02",  
        "description": "Docs check in",  
        "type": "application/vnd.aa.taskbot",  
        "size": "809",  
        "folder": false,  
        "folderCount": "0",  
        "productionVersion": "",  
        "latestVersion": "53160",  
        "locked": false,  
        "lockedBy": "0",  
        "createdBy": "2538",  
        "lastModifiedBy": "2538",  
        "lastModified": "2020-04-08T16:34:36.549Z",  
        "workspaceId": "0",  
        "botStatus": "PUBLIC",  
        "hasErrors": false,  
        "workspaceType": "UNKNOWN",  
        "metadata": false,  
        "uri": "",  
        "version": "3",  
        "hasTriggers": false  
    }  
]
```

## Next steps

Use the numeric values of the response parameters as input values for other API requests. Here is an example with the Start migration API.

- "id": "55709": a unique numeric identifier for a single bot can be used as the input for "botIds": [ 55709 ] in the Migration API.
- "parentId": "55711": a unique numeric identifier for a folder that contains bots can be used as the "folderIds": [ 55711 ] in the Migration API.

## User management APIs

Use User Management APIs to create, search, update, or delete roles and users in your .

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 user's device license

Users with this permission can assign device licenses to users.

## Role APIs

Use Role APIs to create a role, search for roles, retrieve a specific role using an object ID, update a role, or delete a role.

### Create a new role using the API

Creates a new role with a new role name.

```
POST http://<your_control_room_url>/v1/usermanagement/roles
```

### Retrieve a specific role API

Retrieves a specific role based on a unique role ID.

```
GET http://<your_control_room_url>/v1/usermanagement/roles/{id}
```

### Update role

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

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, update, or delete a user.

### Create a new user

Creates a user with a new user name.

```
POST http://<your_control_room_url>/v1/usermanagement/users
```

### Search for users

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

Retrieves user details based on a unique user ID.

```
GET http://<your_control_room_url>/v1/usermanagement/users/{uid}
```

## [Update an existing user](#)

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](#)

Deletes an existing user based on a unique user ID.

```
DELETE http://<your_control_room_url>/v1/usermanagement/users/{uid}
```

Related concepts

[Authentication API](#)

Related reference

[Roles and permissions](#)

## Create a new role using the API

Use Create role API to create a new role with permissions in the Enterprise Control Room.

## Prerequisites

Each permission requires the following 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.

All 3 parameters are required to create the permission.

You need limited administrative permission to create roles.

View roles

View user roles.

Manage roles

Create and manage user roles

Typically a user is given the role permission in conjunction with user management permission. [Roles and permissions](#)

- URL: `http://<your_control_room_url>/v1/usermanagement/roles`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: POST
- 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.

## Procedure

1. Add an authentication token to the request header.  
Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).
2. Select POST as the method.  
`POST http://<your_control_room_url>/v1/usermanagement/roles`
3. In the request body, enter a new name for the role.
4. Send the request.

The following request creates a new role that allows a user to create and manage roles and user in her 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": "getuser",  
      "resourceType": "usermanagement"  
    }  
  ]  
}
```

```

        "action": "rolesview",
        "resourceType": "rolesmanagement"
    },
    {
        "id": 12,
        "action": "rolesmanagement",
        "resourceType": "rolesmanagement"
    }
]
}

```

5. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

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": "rolesview",
            "resourceType": "rolesmanagement"
        }
    ]
}
```

```
"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": []
}
```

Note: You can also run REST requests from a command terminal. The following is a curl request example. This example is formatted for readability. Replace the text inside the angle brackets, <authentication\_token>, with your authentication token. This example has been formatted for readability.

```
curl -X POST "https://<your_control_room_url>/v1/usermanagement/roles"
-H "accept: application/json"
-H "X-Authorization: <token>"
-H "Content-Type: application/json" -d "{ "name": "Role to manage user and roles",
"description": "These are limited administrator permission.",
"permissions": [ {
  "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"
}
]
}
]
}"
```

## Retrieve a specific role API

Use the Return Specific Role API to retrieve a specific role in the Enterprise Control Room.

## Prerequisites

### View Roles

Users who have `view roles` permissions can retrieve details of a specific role. [Roles and permissions](#)

- 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.

## Procedure

1. Add an authentication token to the request header.  
Use the Authentication API to generate a JSON Web Token. [Authentication API](#)
2. Select GET as the method.
3. Add a role ID that you want to retrieve to the URL.  
`GET http://<your_control_room_url>/v1/usermanagement/roles/740`

In this example we used the role ID for a customRole.

- In a REST client, click SEND.
- In the Swagger interface, click Execute.

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": []
}

```

Note: You can also run REST requests from a command terminal. The following is a curl request example. This example is formatted for readability. Replace the text inside the angle brackets, <authentication\_token>, with your authentication token.

```

curl -X GET "http://<your_control_room_url>/v1/usermanagement/roles/740"
-H "accept: application/json"
-H "X-Authorization: <authentication_token>"
-H "Content-Type: application/json" -d "{740}"

```

## Update role

Use the Update Role API to update an existing role in the Enterprise Control Room.

## Prerequisites

### Edit Roles

Users who have `edit roles` permissions can update a role.

- URL: `http://<your_control_room_url>/v1/usermanagement/roles/{ID}`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: PUT
- 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.

This example show how to add a single permission, View users, to the custom role with the ID of 740.

## Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See, [Authentication API](#).

2. Select PUT as the method.

3. In the request URL, add a role ID you want to update.

`PUT http://<your_control_room_url>/v1/usermanagement/roles/740`

Request body:

```
{
  "id": null,
  "name": "Add_one_permission",
  "accessRestriction": null,
  "permissions": [
    {
      "id": 1,
      "action": "usermanagement",
      "resourceType": "usermanagement"
    }
  ]
}
```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

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": []  
}
```

Note: You can also run REST requests from a command terminal. The following is a curl request example. This example is formatted for readability. Replace the text inside the angle brackets, <authentication\_token>, with your authentication token. This example has been formatted for readability.

```
curl -X PUT "https://canary.supremomonono.com/v1/usermanagement/roles/740"
-H "accept: application/json"
-H "X-Authorization: <web_token> "
-H "Content-Type: application/json" -d "{
  "id": null,
  "name": "Add_one_permission",
  "accessRestriction": null,
  "permissions": [
    {
      "id": 1,
      "action": "usermanagement",
      "resourceType": "usermanagement"
    }
  ]
}
}"
```

## Delete an existing role

Use the Delete role API to delete an existing role in the Enterprise Control Room.

### Prerequisites

Manage roles permission

Users who have `manage_roles` permissions can delete roles. However, only custom roles can be deleted, the system-created roles, the first 16 roles with ID 1 to 16, cannot be deleted.

- 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.

### Procedure

1. Add an authentication token to the request header.  
Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).
2. Select DELETE as the method.

3. In the request header, add a role ID you want to delete.

```
DELETE http://<your_control_room_url>/v1/usermanagement/roles/770
```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

Response body:

```
"OK"
```

Note: You can also run REST requests from a command terminal. The following is a curl request example. This example is formatted for readability. Replace the text inside the angle brackets, <authentication\_token>, with your authentication token.

```
curl -X DELETE "http://<your_control_room_url>/v1/usermanagement/roles/22"  
-H "accept: application/json"  
-H "X-Authorization: <authentication_token>"  
-H "Content-Type: application/json" -d "{770}"
```

## Create a new user

Use the Create New User API to create a new user in the Enterprise Control Room.

## Prerequisites

### 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 user's device license

Users with this permission can assign device licenses to users.

## Minimum required parameters

- Roles: Each user must have at least one role. The role id is required to create a role from the User Management API.

[Role](#) based accessibility enables appropriate access to relevant data and actions.

Note: For this example, we created a Bot Creator user. In the request body we assigned the following [Roles and permissions](#):

- AAE\_Basic (ID: 2)
- AAE\_Meta Bot Designer (ID: 13)
- 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)

## Additional recommended parameters

- "enableAutoLogin": true
- "username": "NumerOneUser"
- "firstName": "Doc"
- "lastName": "Writer"
- "email": "username@mydomain.com"
- "password": "changeme"
- "description": "Test user creation."
- "licenseFeatures": [ DEVELOPMENT, RUNTIME, IQBOTRUNTIME, ANALYTICSCLIENT, ANALYTICSAPI ]

Users can be created without an assigned device license. There are [Roles and permissions](#) 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.

## Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).

2. Select POST as the method.

`POST http://<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
    },
    {
      "id": 13
    }
  ],
  "enableAutoLogin": true,
  "username": "BotCreatorUser2",
  "firstName": "AA1",
  "lastName": "Developer",
  "email": "aa.dev@mydomain.com",
  "password": "changeme",
  "description": "AA developer",
  "licenseFeatures": [
    "DEVELOPMENT"
  ]
}
```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

The response returns user details.

Response body:

```
{  
    "id": 1538,  
    "username": "botcreatoruser2",  
    "domain": null,  
    "firstName": "AA1",  
    "lastName": "Developer",  
    "version": 0,  
    "principalId": 1538,  
    "deleted": false,  
    "roles": [  
        {  
            "name": "AAE_Basic",  
            "id": 2,  
            "version": 0  
        },  
        {  
            "name": "AAE_Meta Bot Designer",  
            "id": 13,  
            "version": 0  
        }  
    ],  
    "sysAssignedRoles": [],  
    "groupNames": [],  
    "permissions": [  
        {  
            "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": 63,  
    "action": "metabotdesigner",  
    "resourceId": null,  
    "resourceType": "metabot"  
,  
{  
    "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": true,
"passwordSet": false,
"questionsSet": false,
"enableAutoLogin": true,
"disabled": false,
"clientRegistered": false,
"description": "AA developer",
"createdBy": 1,
"createdOn": "2020-09-03T10:27:30Z",
"updatedBy": 1,
"updatedOn": "2020-09-03T10:27:30Z",
"publicKey": null,
"appType": null,
"routingName": null,
"appUrl": null,
"email": "aa.dev@mydomain.com"
}
```

## Next steps

- You can verify that the user was created by logging in to the Enterprise Control Room as the user that you created.
- System assigned roles, sysAssignedRoles, include a set of permissions that are required by the roles you assigned to the user and default roles that are assigned to all users.

## Search for users

Use the Search for Users API to search for all users in the Enterprise Control Room.

## Prerequisites

### View Users

Users who have `view users` permissions can retrieve all users.

- URL: `http://<your_control_room_url>/v1/usermanagement/users/list`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: POST
- 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/](http://<your_control_room_url>/swagger/)
- You can also use a REST client to complete this task.

## Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).

2. Select POST as the method.

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](#).

POST [http://<your\\_control\\_room\\_url>/v1/usermanagement/users/list](http://<your_control_room_url>/v1/usermanagement/users/list)

3. Send the request.

- In a REST client, click SEND.
- In the Swagger interface, click Execute.

Request body:

The following request finds all users with a `username` that contains `admin` and were created between September 1 and September 6, 2020.

```
{  
  "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"  
      }  
    ]  
  }  
}
```

```
    ]
}
}
```

The response in this example returned data for two usernames containing the word admin, mdadmin and mt\_admin.

Response body:

```
{
  "page": {
    "offset": 0,
    "total": 310,
    "totalFilter": 2
  },
  "list": [
    {
      "id": 1513,
      "username": "mdadmin",
      "domain": "",
      "firstName": "Mira",
      "lastName": "Dytko",
      "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
}
]
}

```

Response body 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.                                                    |

## Retrieve a specific user

Use the Get User Details API to retrieve a specific user in the Enterprise Control Room.

## Prerequisites

### View Users permission

Users who have `view users` permissions can retrieve details of a specific user.

- URL: `GET http://<your_control_room_url>/v1/usermanagement/users/{ID}`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- 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/](http://<your_control_room_url>/swagger/)
- You can also use a REST client to complete this task.

## Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).

2. Select GET as the method.

3. In the request header, add a specific user ID you want to retrieve.

`GET http://<your_control_room_url>/v1/usermanagement/users/1538`

There is no request body for this API.

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

Response body:

```
{  
  "id": 1538,  
  "username": "botcreatoruser2",  
  "domain": null,  
  "firstName": "AA1",  
  "lastName": "Developer",  
  "version": 0,  
  "principalId": 1538,  
  "deleted": false,  
  "roles": [  
    {  
      "name": "AAE_Basic",  
      "id": 2,  
      "version": 0  
    },  
    {  
      "name": "AAE_Meta Bot Designer",  
      "id": 13,  
      "version": 0  
    }  
  ],  
  "sysAssignedRoles": [],  
  "groupNames": [],  
  "permissions": [  
    {  
      "name": "AAE_Basic",  
      "id": 2,  
      "version": 0  
    },  
    {  
      "name": "AAE_Meta Bot Designer",  
      "id": 13,  
      "version": 0  
    }  
  ]  
}
```

```
{  
    "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": 63,  
    "action": "metabotdesigner",  
    "resourceId": null,  
    "resourceType": "metabot"  
,  
{  
    "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": true,  
    "passwordSet": false,  
    "questionsSet": false,  
    "enableAutoLogin": true,  
    "disabled": false,  
    "clientRegistered": false,  
    "description": "AA developer",  
    "createdBy": 1,  
    "createdOn": "2020-09-03T10:27:30Z",  
    "updatedBy": 1,  
    "updatedOn": "2020-09-03T10:27:30Z",  
    "publicKey": null,  
    "appType": null,  
    "routingName": null,  
    "appUrl": null,  
    "email": "aa.dev@mydomain.com"  
}
```

## Update an existing user

Use the Update User Details API to update an existing user information in the Enterprise Control Room.

## Prerequisites

### Edit Users permission

Users who have `edit users` permission can update a specific user details.

- URL: `http://<your_control_room_url>/v1/usermanagement/users/{ID}`

Replace the content in the angle brackets with your Enterprise Control Room URL.

- Method: PUT
- 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.

## Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).

2. Select PUT as the method.

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 Users API.

`PUT http://<your_control_room_url>/v1/usermanagement/users/1538`

The following request body is for an existing user ID: 1538

In the request body, add the request parameters you want to modify, such as, the role ID and the email address.

### Request body

```
{
  "roles": [
    {
      "id": 13
    }
  ],
  "email": "a@a.com"
}
```

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

The response body returns the new email address for the user ID: 1538 and the role ID: 13.

Response body:

```
{  
  {  
    "id": 1538,  
    "username": "botcreatoruser2",  
    "domain": null,  
    "firstName": null,  
    "lastName": null,  
    "version": 0,  
    "principalId": 1538,  
    "deleted": false,  
    "roles": [  
      {  
        "name": "AAE_Meta Bot Designer",  
        "id": 13,  
        "version": 0  
      }  
    ],  
    "sysAssignedRoles": [],  
    "groupNames": [],  
    "permissions": [  
      {  
        "id": 61,  
        "action": "createstandard",  
        "resourceId": null,  
        "resourceType": "credentialattribute"  
      },  
      {  
        "id": 63,  
        "action": "metabotdesigner",  
        "resourceId": null,  
        "resourceType": "metabot"  
      }  
    ],  
    "licenseFeatures": [],  
    "emailVerified": true,  
  }  
}
```

```

    "passwordSet": false,
    "questionsSet": false,
    "enableAutoLogin": false,
    "disabled": false,
    "clientRegistered": false,
    "description": null,
    "createdBy": 1,
    "createdOn": "2020-09-03T10:27:30Z",
    "updatedBy": 1,
    "updatedOn": "2020-09-03T10:59:24Z",
    "publicKey": null,
    "appType": null,
    "routingName": null,
    "appUrl": null,
    "email": "a@a.com"
}

```

## Delete an existing user

Use the Delete Existing User API to delete an existing user in the Enterprise Control Room.

### Prerequisites

#### Edit Users

Users who have `edit users` permissions can delete an existing user.

#### JSON Web Token (JWT)

All Enterprise Control Room APIs require a JSON Web Token (JWT) to access the APIs. Generate an authentication token using the Authentication API. See [Authentication API](#).

- 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

### Procedure

1. Add an authentication token to the request header.

Use the Authentication API to generate a JSON Web Token. See [Authentication API](#).

2. Select DELETE as the method.

3. In the request header, add an existing user ID you want to delete.

`DELETE http://<your_control_room_url>/v1/usermanagement/users/3014`

4. Send the request.

- In Swagger, click Execute.
- In a REST client, click SEND.

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  
}
```

## 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](#).

- [System-created roles](#)

Enterprise A2019 includes predefined roles that cannot be edited or deleted.

- [Administration permissions](#)

Enable users to create and manage users and roles, to manage and update migrations, and to install Enterprise Control Room licenses.

- [API permissions](#)

Enables access to Bot Insight APIs and the ability to generate an API key.

- [Audit log permissions](#)

View logs and details to record user activities. Enable users to view logs from the Enterprise Control Room.

- [Bot and bot credential permissions](#)

Enables users to access features for managing bots and the credentials used by bots.

- [Bot Store permissions](#)

Enables users to view and manage Bot Store packages.

- [Dashboard and activity permissions](#)

Enables all users to view dashboards. Activity permissions enable users to view, manage, and schedule bot activities.

- [Devices permissions](#)

Enable users to register, view, and manage devices used to run bots.

- [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.

- [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.

- [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.

- [Package manager permissions](#)

Enable users to view and manage packages.

- [Workload permissions](#)

Enable users to create and manage workitems, workitem models, queues, and automations in the Enterprise Control Room.

### Related concepts

[Enterprise Control Room APIs](#)

### Related tasks

[Create a new role using the API](#)

# System-created roles

Enterprise A2019 includes predefined roles that cannot be edited or deleted.

| 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 upload and download TaskBots in the My Tasks folder, create credentials and set a standard attribute value, 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 screen. Limited access to Enterprise Control Room features.                                                              |
| 5       | AAE_Bot Insight Consumer | When an Analytics license is installed, permissions to view data in Bot Insight. Limited access to Enterprise Control Room features.                                                                         |
| 6       | AAE_Bot Insight Expert   | When an Analytics license is installed, permissions to view and manage data in Bot Insight. Limited access to Enterprise Control Room features.                                                              |
| 9       | AAE_IQ Bot Services      | Permissions to access the IQ Bot console. Limited access to Enterprise Control Room features.                                                                                                                |

| Role ID | Name                    | Description                                                                                                                                           |
|---------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10      | AAE_Queue Admin         | Permissions to view and manage all queues.                                                                                                            |
| 11      | AAE_Pool Admin          | Permissions to view and manage all device pools.<br>Note: This role does not grant permission to view bots.                                           |
| 12      | AAE_Bot Insight Admin   | The only role that can access Bot Insight APIs to get access to 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 to download bots or Digital Workers from the Bot Store to Enterprise Control Room private workspace.                                      |

Related concepts

[Enterprise Control Room APIs](#)

Related tasks

[Create a new role using the API](#)

## Administration permissions

Enable users to create and manage users and roles, to manage and update migrations, and to install Enterprise Control Room licenses.

It is recommended 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. |

| Permission ID | Action                | Resource Type   | Description                                                                                                                                                                                  |
|---------------|-----------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |                       |                 | 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 in the Enterprise Control Room.                                                                                                                                 |
| 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>Note: You must assign this permission before assigning the <code>rolesmanagement</code> permission. |
| 12            | rolesmanagement       | rolesmanagement | Users can view and manage all roles in the Enterprise Control Room.                                                                                                                          |
| 994           | viewuserrolebasicinfo | 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>Note: You must assign this permission before assigning the <code>manage migration</code> permission |
| 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. |

| Permission ID | Action                | Resource Type     | Description                                                                                |
|---------------|-----------------------|-------------------|--------------------------------------------------------------------------------------------|
| 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](#).

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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 <code>apiKey</code> that can be used in the Authentication API.</p> <p><a href="#">Authenticate with username and apiKey</a></p> <p>Note: Users without the <code>generateapikey</code> permission can use APIs by authenticating using their username and password.</p> <p><a href="#">Authenticate with username and password</a></p> |

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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 using the API](#)

Related reference

[Roles and permissions](#)

## 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>Note: You must assign this permission before assigning any other bots permissions. |
| 7             | run            | repositorymanager | Allows users to view and manage Bot Runners.                                                                                                                          |
| 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>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>Note: All roles have this permission by default. |
| 26            | create            | locker                   | User can create and manage their own lockers.                                                                                                                                                 |
| 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.                                                                                                                                 |

Note: A user with the `AAE_Locker Admin` role can view all credentials and lockers in the Enterprise Control Room. See [System-created roles](#).

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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 using the API](#)

Related reference

[Roles and 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            | managemschedule            | taskscheduling | All users can pause, resume, or cancel their own activity and move their finished activities to history.                                                                                  |
| 52            | manageeveryonechedule      | taskscheduling | A user can monitor ongoing automations where a user has either run or scheduled 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. |
| 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 using the API](#)

Related reference

[Roles and 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. Note: All roles have this permission by default. |
| 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](#).

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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. |

| Permission ID | Action | Resource Type | Description                                     |
|---------------|--------|---------------|-------------------------------------------------|
| 122           | manage | eventtriggers | Allows users to view and manage event triggers. |

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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         | Allows users to view the default dashboards in the IQ Bot portal.<br>Note: You must assign this permission before assigning any of the permissions below. |

## Learning instance permissions

| Permission ID | Action                           | Resource Type        | Description                                                                                                                                                           |
|---------------|----------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 70            | viewlearninginstance             | viewiqbot            | Allows users to view their learning instances in the IQ Bot portal.<br>Note: You must assign this permission before assigning any other learning instance permission. |
| 79            | viewlearninginstancefromsamerole | 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            | createlearninginstances          | viewlearninginstance | Allows users to create learning instances in the IQ Bot portal.                                                                                                       |
| 75            | editlearninginstances            | viewlearninginstance | Allows users to edit learning instances in the IQ Bot portal.                                                                                                         |

| Permission ID | Action                      | Resource Type        | Description                                                                       |
|---------------|-----------------------------|----------------------|-----------------------------------------------------------------------------------|
| 76            | deletelearninginstances     | viewlearninginstance | Allows users to delete their learning instances in the IQ Bot portal.             |
| 77            | sendlearninginstancestoprod | viewlearninginstance | Allows users to send their learning instances to production in the IQ Bot portal. |
| 78            | trainlearninginstancegroups | viewlearninginstance | 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>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>Note: You must assign this permission before assigning any other administration permissions. |
| 86            | viewandmanagesettings  | 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 using the API](#)

### Related reference

[Roles and 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](#)

## 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 using the API](#)

Related reference

[Roles and 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](#).

Related tasks

[Create a new role using the API](#)

Related reference

[Roles and 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](#)
  - b) [Create queues API](#)
  - c) [Add queue owner or member API](#)
  - d) [Add queue participants API](#)
  - e) [Add queue consumer API](#)
  - f) [Add Work Items to the queue API](#)
3. [Create device pool API](#)
4. [Run bot with queue API](#)

### 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](#)

## 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.

### Prerequisites

You must have the following:

- Create queues or AAE\_Queue Admin permission
- The endpoint URL: <your\_control\_room\_url>/v3/wlm/workitemmodels

### Procedure

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](#).

## Next steps

### [Create queues](#)

Related tasks

[List Work Item models](#)

## 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.

## Prerequisites

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

## Procedure

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](#)

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](#).

## Next steps

[Add queue owner or member](#)

Related tasks

[List WLM queues](#)

## 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.

## Prerequisites

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

## Procedure

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](#)

- 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](#)

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](#).

## Next steps

### [Add queue participants](#)

## Add queue participants API

Add queue participants from different roles defined in the Enterprise Control Room.

### Prerequisites

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

### Procedure

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](#)

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  
  }
```

```
"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](#).

## Next steps

[Add queue consumer](#)

Add queue consumer API

Add queue consumers from different roles defined in the Enterprise Control Room.

## Prerequisites

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

## Procedure

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](#)

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,  
    "queueId": 17,  
    "roleIds": [21]  
  }  
]
```

```
"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](#).

## Next steps

[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.

## Prerequisites

- 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

## Procedure

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](#)

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](#).

## Next steps

[Create an automation to run a bot with a queue](#)

Related tasks

[List Work Items in queue](#)

## 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.

## Prerequisites

- 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

## Procedure

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](#)

- 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](#)

- 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](#)

In this example, the parameters are entered as follows:

- Automation name as Finance-RPA-Run
- Bot fileName as wlmq1
- 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": "wlmq1",
  "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](#).

## 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](#)
- [List WLM queues](#)
- [List Work Items in queue](#)

## 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.

### Prerequisites

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

### Procedure

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](#)

## 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.

### Prerequisites

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"
  }
}
```

## Procedure

1. Use the POST method to generate an authentication JSON Web Token.  
[Authentication API](#)
2. 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": "desc",  
          "tenantUuid": "4db5b32c-5c4b-4aee-8ca0-f53ec241563c"  
        }  
      ]  
    }  
  ]  
}
```

```
        "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](#)

## 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.

### Prerequisites

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"
  }
}
```

## Procedure

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 (col1).

Request body:

```
{
  "sort": [
    {
      "field": "computedStatus",
      "direction": "asc"
    }
  ],
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "eq",
        "value": "NEW",
        "field": "status"
      },
      ...
    ]
  }
}
```

```
{
    "operator": "substring",
    "value": "Brian",
    "field": "col1"
}
],
},
"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 (col1) and status is NEW.

Response body:

```
{
"page": {
    "offset": 0,
    "total": 5,
    "totalFilter": 1
},
"list": [
{
    "id": "11804",
    "createdBy": "24",
    "createdOn": "2020-05-26T10:19:34.786Z",
    "updatedBy": "24",
    "updatedOn": "2020-05-26T10:19:34.786Z",
    "status": "NEW"
}
]
```

```
"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](#)

## 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

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

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

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": "eq",
        "field": "status",
        "value": "CHECKED_OUT"
      },
      {
        "operator": "substring",
        "field": "name",
        "value": "finance"
      }
    ]
  }
}
```

```
{
    "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.
- 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.

## 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

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.

- [Accessing Bot Insight](#)

This section provides information about how to access Bot Insight.

- [Using Bot Insight](#)

Use Automation Anywhere Bot Insight to track bot data for analytics.

- [Using widgets](#)

The Bot Insight dashboard provides a host of highly customizable widgets that you can use to gain insights for specific scenarios.

- [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.

- [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.

## 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](#)

Related tasks

[Run your first bot](#)

Related reference

[Analyze package](#)

## 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.

- [Roles to access Bot Insight](#)

The Enterprise Control Room restricts Bot Insight access to users with certain roles.

- [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.

- [Bot Insight dashboards](#)

The Bot Insight dashboards provide dedicated graphical insight to help you view your bot information.

## Access Bot Insight from the Enterprise Control Room

Access Bot Insight to interactively analyze bot data and enhance bot widgets.

## Procedure

Access Bot Insight from the Enterprise Control Room in one of the following ways:

- From the Enterprise Control Room, select Dashboard.
  1. Locate the Insights tab.
  2. In the Insights tab, click Explore Bot Insight.  
The Bot Insight window appears.
- From the Bots menu, click My Bots:
  1. 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.
  2. 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.
  3. Select your bot from the Files and Folders menu.  
Alternatively, enter the search parameters in the Search Name field and search for your bot.
  4. 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    | Sales1    | Yes       | Yes  | Yes  | No            | No      |
|                               | Sales2    | Yes       | Yes  | Yes  | No            | No      |
| Access to the Accounts folder | 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](#)
- [Business dashboard](#)

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.

- [\*\*Viewing Insights\*\*](#)

You can view information about business data in Bot Insight.

- [\*\*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.

- [\*\*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.

- [\*\*Editing a data profile\*\*](#)

You can modify the data profile of both the Default and Custom Business dashboards without modifying the bots.

- [\*\*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.

- [\*\*Working with Bot Insight dashboards\*\*](#)

You can save or delete a Bot Insight dashboard when required. You can also delete a user-created dashboard.

- [\*\*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.

- [\*\*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.

## 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.

## Procedure

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.

## Procedure

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

### 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.

#### Roles

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
- Comparing dashboards
- Sharing a dashboard
- Taking a screenshot of a dashboard
- Downloading a PDF file from a dashboard

## 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](#)

In the Custom dashboard, Bot Insight enables you to export data from a dashboard widget to CSV files.

#### [Exporting data from a dashboard widget](#)

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](#)

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
- Comparing dashboards
- Sharing a dashboard
- Taking a screenshot of a dashboard
- Downloading a PDF file from a dashboard

## 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.

## Procedure

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.

- [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.

Related concepts

[Operations dashboard](#)

## 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.

### Procedure

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:
    - c) Click Include to include the variable in the dashboard filter.
    - d) Click Exclude to exclude the variable in the dashboard filter.
  - e) 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](#)

### 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.

## Procedure

- Save a dashboard:
  1. Open the dashboard that you want to save.
  2. From the Actions menu, select Save as.  
The Save Dashboard window appears.
  3. In the Dashboard Name field, enter the name for the dashboard.
  4. In the Dashboard Description field, enter the description of the dashboard.
  5. Click Save.  
Click Save As to save a default dashboard as a customized dashboard.
- Open the dashboard you want to delete.
  1. Click Delete on the toolbar.
  2. 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.

## Procedure

- Compare dashboards:
  1. Open the dashboard that you want to compare.
  2. 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:
  1. 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.
  2. Select the Left View or Right View.
  3. Select the Attributes, Numeric, or Time widgets that you want to apply.
  4. Optional: Click Clear All to reset all your widget selections.
  5. 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.
- [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.
- [Previewing data](#)  
You can view all the variable data associated with a task using the Preview Data option.
- [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.
- [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.
- [Reviewing data in a published dashboard](#)  
You can review the data available in a published dashboard.
- [Sharing a dashboard](#)  
You can share the link to view a dashboard through email using the Share via email option.
- [Downloading a PDF file from a dashboard](#)  
You can download the data available in the dashboard as a PDF file.
- [Taking a screenshot of a dashboard](#)  
You can take a screenshot of the data available in the dashboard.

#### Related tasks

[Editing a data profile](#)

## 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.

### Procedure

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.

### Procedure

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.

### Procedure

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.

### Prerequisites

Before you publish a dashboard, ensure that the particular bot resides in the Public folder in the Enterprise Control Room.

### Procedure

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](#)

## Reviewing data in a published dashboard

You can review the data available in a published dashboard.

### Procedure

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.

### Procedure

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.

## Procedure

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.

## Procedure

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.

## 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.

### 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:

### Procedure

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](#).

3. Build a bot.

For more information about building and editing a bot, see [Get started building bots](#).

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.

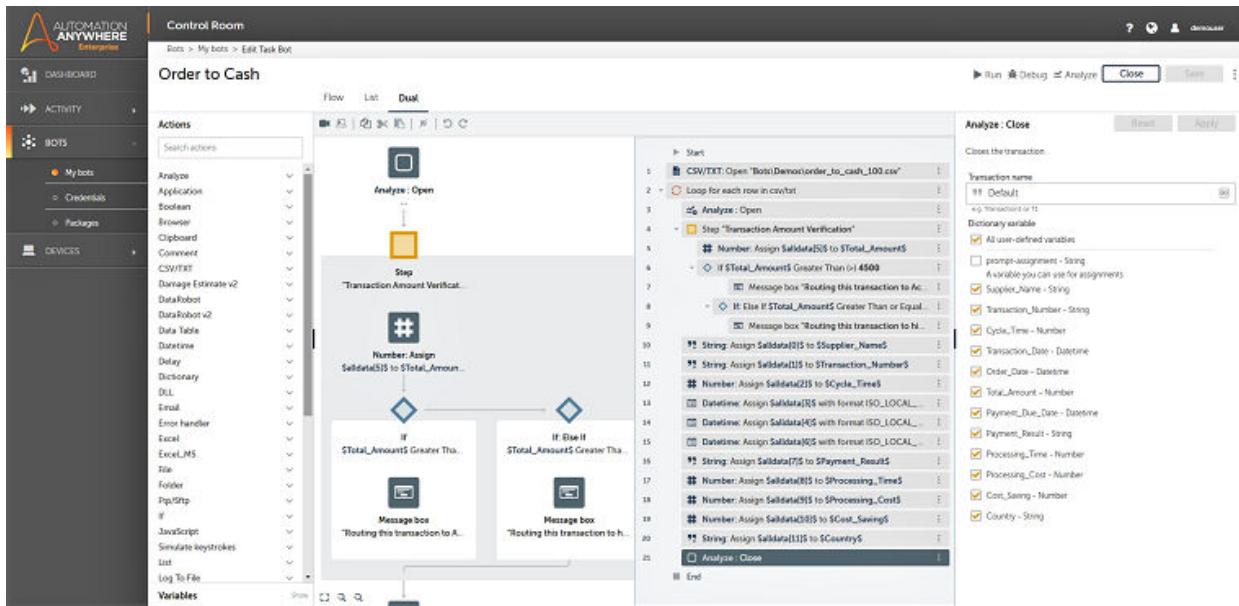
6. Click Apply.

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

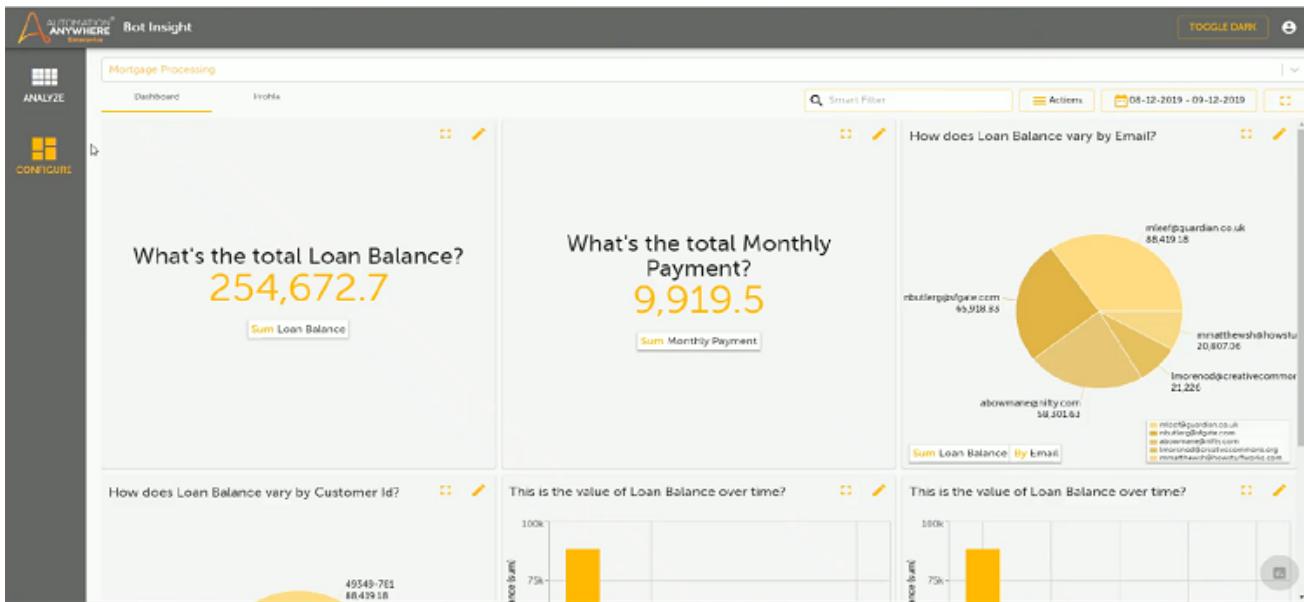
The Bot Insight dashboard provides a host of highly customizable widgets that you can use to gain insights for specific scenarios.

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.
  - [Editing a dashboard widget](#)  
You can edit the dashboard widget properties based on your requirements.
  - [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.
  - [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.
  - [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.

## Adding a dashboard widget

You can add custom widgets to the Bot Insight dashboard based on your requirements.

### Procedure

- ## 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](#).  
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](#).
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.

- [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.

## 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 is no 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](#)

Related tasks

[Adding a dashboard widget](#)

### 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.

### Procedure

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.

1. Enter the title of your widget in the Chart Title field.

2. 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.

3. 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.

4. Select a value from the Group By or Group 1 field.

5. 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.

6. 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.

1. Click Advanced Settings.

The settings display the default values. You can change the value of the fields if required.

2. Select a limit value in the Limit or Group Limit field.

3. Select a sort value in the Sort By or Group Sort By field.

4. Select a sort order value in the Sort Order or Group Sort Order field.

5. Select a secondary limit value in the Sub Group Limit or Group 2 Limit field.

6. Select a secondary sort value in the Sub Group Sort By or Group 2 Sort By field.

7. 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.

## Procedure

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:

### Procedure

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
- Mortage 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:

### Procedure

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.

### Procedure

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.

## 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.

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.

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](#)

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](#)

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](#)

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 1. Body parameters

| Parameter                   | Description                                                                                                                 | Type   | Required | Notes                                   |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------|--------|----------|-----------------------------------------|
| <code>botname</code>        | 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 |                                         |
| <code>repositorypath</code> | Enterprise Control Room repository path of the bot.                                                                         | string | optional |                                         |
| <code>environment</code>    | Specifies the environment: <code>DEV</code> or <code>PROD</code>                                                            | string | optional |                                         |
| <code>runId</code>          | ID number that is generated when the bot runs.                                                                              | string | optional |                                         |
| <code>fromDate</code>       | Start date of the period for which to retrieve the data. If you do not                                                      | date   | optional | Format <code>yyyy-mm-ddThh:mm:ss</code> |

| Parameter           | Description                                                                                                                                             | Type | Required | Notes                                                            |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|------------------------------------------------------------------|
|                     | provide this parameter, the API will return all available data.<br>Note: Do not provide this parameter if you provide the <code>runId</code> parameter. |      |          |                                                                  |
| <code>toDate</code> | End date of the period for which to retrieve the data.<br>Note: Do not provide this parameter if you provide the <code>runId</code> parameter.          | date | optional | Default: current date<br>Format <code>yyyy-mm-ddThh:mm:ss</code> |

Table 2. Header

| Header name     | Value                                                        |
|-----------------|--------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</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 1. Query parameters

| Parameter            | Description                                                                       | Type   | Required | Notes                     |
|----------------------|-----------------------------------------------------------------------------------|--------|----------|---------------------------|
| <code>botname</code> | Name of the bots for which to retrieve data. Separate each bot name with a comma. | string | optional | Enter up to 10 bot names. |

| Parameter | Description                                                                                                                                                                                                                                                                                                                               | Type    | Required | Notes                                               |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|-----------------------------------------------------|
|           | If you do not provide this parameter, the API will return data on all the bots.                                                                                                                                                                                                                                                           |         |          |                                                     |
| pageno    | Page number from which to retrieve the data.                                                                                                                                                                                                                                                                                              | integer | optional |                                                     |
| limit     | <p>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:</p> <p>0 page returns 1 - 2500<br/>           1st page returns 2501 - 5000<br/>           2nd page returns 5001 - 7500<br/>           3rd page returns 7501 - 10000</p> | 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>Format yyyy-mm-ddThh:mm:ss |

Table 2. Header

| Header name     | Value                                                        |
|-----------------|--------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</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-93a6-8fefef5462e51",
        "transactionId":"f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",
        "dateLogged":"2019-10-24T09:25:02.194365800Z",
        "data":{},
        "environment":"PROD"
      }
    ]
  },
  {
    "transactionName":"block2",
    "transactions": [
      {
        "executionId":"e05f4c41-00e5-4b1b-93a6-8fefef5462e51",
        "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 1. Query parameters

| Parameter             | Description                                                                                                                                                                                                                                                                                                                                                                     | Type    | Required | Notes                                                            |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|------------------------------------------------------------------|
| <code>pageno</code>   | Page number from which to retrieve the data.                                                                                                                                                                                                                                                                                                                                    | integer | optional |                                                                  |
| <code>limit</code>    | <p>Specifies the number of parts in which the information is retrieved. For example, if you specify the limit as <code>2500</code> to retrieve a total of 10000 records, then:</p> <ul style="list-style-type: none"> <li>0 page returns 1 - 2500</li> <li>1st page returns 2501 - 5000</li> <li>2nd page returns 5001 - 7500</li> <li>3rd page returns 7501 - 10000</li> </ul> | integer | optional |                                                                  |
| <code>fromDate</code> | 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 <code>yyyy-mm-ddThh:mm:ss</code>                          |
| <code>toDate</code>   | End date of the period for which to retrieve the data.                                                                                                                                                                                                                                                                                                                          | date    | optional | Default: current date<br>Format <code>yyyy-mm-ddThh:mm:ss</code> |

Table 2. Header

| Header name                  | Value                                                        |
|------------------------------|--------------------------------------------------------------|
| <code>X-Authorization</code> | <authentication_token><br><a href="#">Authentication API</a> |

## 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/getaudittrailedata
```

Table 1. Query parameters

| Parameter           | Description                                                                                                   | Type    | Required | Notes |
|---------------------|---------------------------------------------------------------------------------------------------------------|---------|----------|-------|
| <code>pageno</code> | Page number from which to retrieve the data.                                                                  | integer | optional |       |
| <code>limit</code>  | Specifies the number of parts in which the information is retrieved. For example, if you specify the limit as | integer | optional |       |

| Parameter | Description                                                                                                                                                                                        | Type | Required | Notes                                               |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|-----------------------------------------------------|
|           | 2500<br>to retrieve a total of 10000 records,<br>then:<br><br>0 page returns 1 - 2500<br><br>1st page returns 2501 - 5000<br><br>2nd page returns 5001 - 7500<br><br>3rd page returns 7501 - 10000 |      |          |                                                     |
| 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 2. Header

| Header name     | Value                                                        |
|-----------------|--------------------------------------------------------------|
| X-Authorization | <authentication_token><br><a href="#">Authentication API</a> |

## Sample output

```
{
  "totalRecords": 0,
  "auditTrailDataList": [
    {
      "activityType": "string",
      "createdBy": "Unknown Type: intger",
      "createdOn": "string",
      "detail": "string",
      "environmentName": "string",
      "eventDescription": "string",
      "hostName": "string",
      "id": "string",
      "lastModifiedBy": "string",
      "lastModifiedOn": "string",
      "logLevel": "string",
      "logType": "string",
      "logValue": "string",
      "logValue2": "string",
      "logValue3": "string",
      "logValue4": "string",
      "logValue5": "string",
      "logValue6": "string",
      "logValue7": "string",
      "logValue8": "string",
      "logValue9": "string",
      "logValue10": "string",
      "logValue11": "string",
      "logValue12": "string",
      "logValue13": "string",
      "logValue14": "string",
      "logValue15": "string",
      "logValue16": "string",
      "logValue17": "string",
      "logValue18": "string",
      "logValue19": "string",
      "logValue20": "string",
      "logValue21": "string",
      "logValue22": "string",
      "logValue23": "string",
      "logValue24": "string",
      "logValue25": "string",
      "logValue26": "string",
      "logValue27": "string",
      "logValue28": "string",
      "logValue29": "string",
      "logValue30": "string",
      "logValue31": "string",
      "logValue32": "string",
      "logValue33": "string",
      "logValue34": "string",
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      "logValue36": "string",
      "logValue37": "string",
      "logValue38": "string",
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      "logValue42": "string",
      "logValue43": "string",
      "logValue44": "string",
      "logValue45": "string",
      "logValue46": "string",
      "logValue47": "string",
      "logValue48": "string",
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      "logValue50": "string",
      "logValue51": "string",
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      "logValue54": "string",
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      "logValue60": "string",
      "logValue61": "string",
      "logValue62": "string",
      "logValue63": "string",
      "logValue64": "string",
      "logValue65": "string",
      "logValue66": "string",
      "logValue67": "string",
      "logValue68": "string",
      "logValue69": "string",
      "logValue70": "string",
      "logValue71": "string",
      "logValue72": "string",
      "logValue73": "string",
      "logValue74": "string",
      "logValue75": "string",
      "logValue76": "string",
      "logValue77": "string",
      "logValue78": "string",
      "logValue79": "string",
      "logValue80": "string",
      "logValue81": "string",
      "logValue82": "string",
      "logValue83": "string",
      "logValue84": "string",
      "logValue85": "string",
      "logValue86": "string",
      "logValue87": "string",
      "logValue88": "string",
      "logValue89": "string",
      "logValue90": "string",
      "logValue91": "string",
      "logValue92": "string",
      "logValue93": "string",
      "logValue94": "string",
      "logValue95": "string",
      "logValue96": "string",
      "logValue97": "string",
      "logValue98": "string",
      "logValue99": "string",
      "logValue100": "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 1. Query parameters

| Parameter                   | Description                                         | Type   | Required | Notes |
|-----------------------------|-----------------------------------------------------|--------|----------|-------|
| <code>botname</code>        | Name of the bot for which to retrieve data.         | string | optional |       |
| <code>repositorypath</code> | Enterprise Control Room repository path of the bot. | string | optional |       |

Table 2. Header

| Header name                  | Value                                                        |
|------------------------------|--------------------------------------------------------------|
| <code>X-Authorization</code> | <authentication_token><br><a href="#">Authentication API</a> |

## Sample output

```
{
  "businessData": [
    {
      "totalRecords":23,
      "count":23,
      "records": [
        {
          "id": "string",
          "objectName": "string",
          "requestId": "string",
          "source": "string",
          "status": "string",
          "userName": "string"
        }
      ]
    }
  ]
}
```

```
"pageNo":1,  
"botId":"PROD_12",  
"botName":"testBot",  
"repositoryPath":"Automation Anywhere/Bots/testBot",  
"list": [  
    {  
        "transactionName": "block1",  
        "transactions": [  
            {  
                "executionId": "e05f4c41-00e5-4b1b-93a6-8fefef5462e51",  
                "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",  
                "dateLogged": "2019-10-24T09:25:02.194365800Z",  
                "data": {  
                },  
                "environment": "PROD"  
            }  
        ]  
    },  
    {  
        "transactionName": "block2",  
        "transactions": [  
            {  
                "executionId": "e05f4c41-00e5-4b1b-93a6-8fefef5462e51",  
                "transactionId": "f1c9edfa-ccc5-4b75-9ddb-cd28d8743b77",  
                "dateLogged": "2019-10-24T09:25:02.194365800Z",  
                "data": {  
                },  
                "environment": "PROD"  
            }  
        ]  
    }  
]
```

## 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`
- `gettakvariableprofile`
- `gettaklogdata`

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.

- [Deploy Power BI connector](#)

Deploy the data connector in Power BI to retrieve information from the Bot Insight API to enable data analytics.

- [Configure Power BI connector](#)

Configure the data connector in Power BI to retrieve information from the Bot Insight API to enable data analytics.

- [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.

Related reference

[Bot Insight API](#)

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.

### Prerequisites

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.

### Procedure

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.

### Next steps

[Configure Power BI connector](#)

## Configure Power BI connector

Configure the data connector in Power BI to retrieve information from the Bot Insight API to enable data analytics.

### Prerequisites

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.

### Procedure

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](#).

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.

### Procedure

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.