

A blurred background image showing a large crowd of people walking on a red carpet at what appears to be a formal event or conference. The people are dressed in business attire, and the scene is filled with motion blur.

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# Automation Anywhere Version 11.3

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# Automation Anywhere Release Notes

This document for Automation Anywhere (AAE) 11.3.x describes new capabilities, changed features, fixed features (resolved issues), security fixes, deprecated features, and known limitations.

Follow the links in the table to view the release notes for the respective release.

Major Release	Minor Release	Patch Release
<a href="#">Version 11.3</a>	<a href="#">Version 11.3.3</a>	
	<a href="#">Version 11.3.2</a>	<a href="#">Version 11.3.2.3</a> <a href="#">Version 11.3.2.2</a> <a href="#">Version 11.3.2.1</a>
	<a href="#">Version 11.3.1</a>	<a href="#">Version 11.3.1.4</a> <a href="#">Version 11.3.1.3</a> <a href="#">Version 11.3.1.2</a> <a href="#">Version 11.3.1.1</a>

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Upgrade considerations

To ensure a successful upgrade to Automation Anywhere version 11.3.x, review these considerations before starting the upgrade process.

### Upgrading Automation Anywhere Enterprise client

When installing the new Enterprise client 11.3.x.x version over an existing 10.x or 11.x (versions before 11.3) version, do the following steps:

1. Uninstall any existing Enterprise client (versions before 11.3).
2. Install the full version of the 11.3 Enterprise client.
3. Install any new 11.3.x.x version with the provided setup file.

The Enterprise client points to the same repository path, ensuring access to the existing bots.

## Upgrading Automation Anywhere Enterprise Control Room

Review the following version-specific considerations before upgrading:

- **11.3.2.3** The Enterprise Control Room installer is not available for the Version 11.3.2.3 release.
- **11.3.3** The upgrade process for Version 11.3.3 is faster and requires minimal inputs. It allows you to review previous configuration as they are displayed as is and update certain configurations. See [Upgrade to a higher 11.x version](#).
- **11.3.1.4** The Enterprise Control Room Version 11.3.1.4 update has two different installers, one for base 11.3.1 and 11.3.1.1, named 11.3.1.4 (base 11.3.1) and the other for base 11.3.1.2, named 11.3.1.4 (base 11.3.1.2). Download the suitable installer depending on your current base version.

To apply the patch on Enterprise Control Room Version 11.3.1, Version 11.3.1.1, and Version 11.3.1.2, run the setup file and point to the existing Enterprise Control Room database.

- **11.3.2.2** If you already have the previous Enterprise Control Room patch installed, you must uninstall the previous patch before installing the Enterprise Control Room Version 11.3.2.2 patch.
- **11.3.2.2** Reboot the server after uninstalling the Enterprise Control Room Version 11.3.2.2 patch to ensure any processes holding specific binaries are freed up.
- **11.3.2** To access the existing version of the IQ Bot using the upgraded Version 11.3.2 of the Enterprise Control Room, disable the authentication by doing the following steps:
  1. Go to the config folder in the Enterprise Control Room install folder.
  2. Add the following property on each node in the cluster.properties file:

```
ignite.security.disable=true
```

- In the distributed environment, open the cluster.properties file and add the property.
- In the standalone environment, create a cluster.properties file, add the property, and save the file in the config folder.
- 3. From the service console on each node, restart the Bot Insight and Enterprise Control Room Windows services. See [Verifying Automation Anywhere Windows services](#) for a list of services.
- **11.3.1.3** The Enterprise Control Room installer is not available for the Version 11.3.1.3 release.
- **11.3.1.2** To upgrade to the Enterprise Control Room Version 11.3.1.2 using a complete setup, run the setup file and point to the existing Enterprise Control Room database.
- **11.3.1.1** To apply a patch on Enterprise Control Room Version 11.3.1, do not uninstall the existing version. Run the Enterprise Control Room Version 11.3.1.x setup file and point to the existing Enterprise Control Room database. If you have a version earlier than Version 11.3.1 installed, first install Version 11.3.1 because it is the base version for the Enterprise Control Room 11.3.1.x patch releases.

For information on migrating data after upgrading, see the Migration topic.

Related concepts

[Migration overview](#)

Related reference

[Upgrade to a higher 11.x version](#)

[Installation](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version compatibility matrix

Before you install or upgrade verify the compatible of your Automation Anywhere Enterprise Control Room and Enterprise client versions.

Note:

- TaskBots created in earlier releases are compatible with this release.
- TaskBots and MetaBots created/saved in this release do not work if the product is downgraded to earlier versions. For example: TaskBots created in the Automation Anywhere 11.3 do not work in Automation Anywhere 10 LTS. because the 11.x obfuscation algorithm is enhanced from 10.x.
- MetaBots created in earlier versions are compatible with this version.
- For IQ Bot Version 6.0 or later to Enterprise Control Room Version 11.3 or later compatibility, see the IQ Bot documentation.

### Enterprise Control Room – Enterprise client compatibility matrix, versions 11.x

Enterprise client version	Enterprise Control Room version						
	11.3.3	11.3.2	11.3.1	11.3	11.2	11.1	11.0
11.3.3	Y	Y	N	N	N	N	N
11.3.2	Y	Y	N	N	N	N	N
11.3.1	Y	Y	Y	N	N	N	N
11.3	Y	Y	Y	Y	N	N	N
11.2	Y	Y	Y	Y	Y	N	N
11.1	Y	Y	Y	Y	Y	Y	N
11.0	Y	Y	Y	Y	Y	Y	Y

Patch release notes

**11.3.1.3** Automation Anywhere Enterprise client Version 11.3.1.3 is compatible with Automation Anywhere Enterprise Control Room Version 11.3, Version 11.3.1, and Version 11.3.2.

### Enterprise Control Room – Enterprise client compatibility matrix, versions 10.x

Enterprise client version	Enterprise Control Room version						
	10 SP2	10.3.x	10.2.1	10.2.0	10.1.0	10.0.x	10.0
10 SP2	Y	N	N	N	N	N	N
10.3.x	Y	Y**	N	N	N	N	N

Enterprise client version	Enterprise Control Room version						
	10 SP2	10.3.x	10.2.1	10.2.0	10.1.0	10.0.x	10.0
10.2.1	Y*	Y*	Y	Y	N	N	N
10.2.0	Y*	Y*	Y	Y	N	N	N
10.1.0	Y*	Y*	Y	Y	Y	N	N
10.0.x	Y*	Y*	Y	Y	Y	Y	Y
10.0.0	Y*	Y*	Y	Y	Y	Y	Y

Table legend
N, Indicates not compatible
Y, Indicates compatible version
Y*, From version 10.3 (for example, 10 LTS) onwards, MetaBots are stored as Single File Format, as opposed to the old folder based structure. Therefore, MetaBots created in earlier versions cannot be directly used with the 10.3.0 Enterprise Control Room. They must be converted to Single File Format first and then used in 10.3.0 version.
Y**, The Enterprise Control Room version must be equal or higher than the Enterprise client version.

## Products Compatibility Matrix for Upgrade

Following matrix shows products compatibility of Enterprise Control Room, Bot Insight, IQ Bot, and BotFarm versions for upgrading to Enterprise Control Room Version 11.3.

Enterprise Control Room		Bot Insight		IQ Bot		BotFarm	
Version	Upgrade to 11.3	Version	Upgrade to 11.3	Version	Upgrade to 11.3	Version	Upgrade to 11.3
11.2.x	Y	-	-	-	-	-	-
11.1.x	Y	-	-	-	-	-	-
11.0.0	N	11.0.0	N	-	-	2.0	-
10.5.x	Y	2.1	Y	5.x	-	1.4	-
10.3.x	Y	1.5.2	Y	-	-	1.3	-
10.0.x -10.2.x	N	-	-	-	-	1.2	-
8.x, 9.x	N	-	-	-	-	-	-

Note: " - " indicates not available, "N" indicates not supported, and "Y" indicates supported version.

Related reference

[Upgrade considerations](#)

[Feature comparison matrix](#)

## Feature comparison matrix

Compare features between different product releases.

### Enterprise Control Room version feature matrix

Feature	Version 11	Version 10
Active Directory with security groups for Enterprise Control Room roles	Y	-
API based deployment	Y	Y
API bot deployment	Y	Y
APIs bot login credentials	Y	-
APIs Credential Vault	Y	-
APIs data migration	Y	-
Audit	Detailed with changes	Basic
Bot lifecycle management	Y	-
Bot Runner health check	Y	-
Bot Runner session on Enterprise Control Room	Y	Y
Bot Store integration	Y	-
Centralized bot deployment	Y	Y
Centralized licensing	Y	Y
Centralized scheduling	Advanced with Repeat option	Basic
Credential Vault	Advanced with RBAC, Lockers	Standard
Configurable password policy	Y	-
Create/rename folders in Enterprise Control Room	Y	-
Customizable help links	Y	Y
Dashboard	Graphical, drilldown UI	Basic
Data migration	Web-based tool	Desktop Utility
Data storage	SQL Database	SQL Database
Email notifications	Y	Y
High Availability mode	Y	Y
Hosting technology	Java	IIS

Feature	Version 11	Version 10
Load balancing	Y	Y
Mode of authentication	SSO, AD (with Kerberos), non-AD	AD, non-AD
Multi-domain support	Y	Y
Operations room	Detailed	Standard
Role Based Access Control	Y	Y
Roles and permissions	Y	Y
SQL 2016 support	Y	-
Type	Web	Web
User Interface	Rich and responsive UI Controls	Standard Web UI
Version control integration	Y	Y
Workload management	Y	-

## Enterprise client version feature matrix

The Enterprise client includes Bot Creator and Bot Runner

Feature	Version 11	Version 10
AI-Sense	Y	-
Auto Login support for Citrix logoff	Y	-
Auto mode in OCR	Y	-
Bot obfuscation	AES-256 algorithm	Basic 3DES
MetaBot obfuscation	Y	-
TaskBot obfuscation	Y	-
Zip package export	Y	-
Citrix certified Enterprise client	Y	-
Citrix certified Enterprise client remote agent	Y	-
Command-line login to Enterprise client	Y	-
Dictionary variable for all commands	Y	-
Disaster Recovery of Bot Runner	Y	-
Dynamic DOMXPath with Object Cloning support	Y	-
Dynamic Java automation	Y	Y
Ease of Use (drag and drop)	Y	Y

Feature	Version 11	Version 10
Excel session sharing with sub-task	Y	-
IQ Bot	Y (Centralized platform)	Y (Basic training)
Japanese language support	Y	-
Japanese text sent in provisioned encoding combo-box in VT100 Terminals with Advanced Technology enabled.	Y	-
Linguify batch file reinstall with updated MSI, does not require reinstalling Enterprise client	Y	-
MetaBot	Y	Y
MetaBot folders	Y	-
Microsoft Edge browser support	Y	-
Microsoft logo certification	Y	-
Windows 10	Y	-
Microsoft Windows Server 2016	Y	-
Multi-user support (Citrix/Terminal server)	Y	Y
Number of Commands	480+	480+
Object cloning technology selection	Y	-
OCR engine integration	Y	Y
Online help	Y	Y
Packaging bot dependencies	Y	Y
Quick command replication	Y	-
Recorders	Smart Recorder, Web Recorder, Screen Recorder	Smart Recorder, Web Recorder, Screen Recorder
Resolution independent IR	Y	-
Secure recording	Y	Y
SAP Integration command for native object	Y	-
Service insight bot integration within Enterprise client	Y	-
Terminal emulator Model IBM-5555-xxx DBCS	Y	-
Terminal emulator VT220	Y	-
Workbench integration	Y	-

## Bot Insight version feature matrix

Feature	Version 11	Version 2.1
Denser dashboards	Y	-
Data caching improvements	Y	-
Double byte data visualizations	Y	Y
Fluid visualization engine	Y	-
High Availability	Y	Y
Installer	Integrated installer	Separate installer
Multi-domain support	Y	Y

Note: “-” indicates not available and “Y” indicates available feature.

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

## Operating system and platform compatibility

Enterprise Control Room and Enterprise client both are installed on machines with supported operating systems. The Enterprise Control Room and Enterprise client tables list the supported Windows versions.

Both 32-bit and 64-bit OS versions are supported.

### Enterprise Control Room operating system compatibility

Enterprise Control Room can be installed on machines running the following operating systems.

Windows version	Version edition
Server 2019	Standard and Datacenter
Server 2016	Standard and Datacenter
Server 2012 R2	Standard and Datacenter

### Enterprise Control Room platform compatibility

Enterprise Control Room versions support the listed operating systems on a variety of platforms:

Servers

See [Hardware requirements](#). All listed operating systems and Enterprise Control Room versions.

Cloud servers

AWS, Google Chrome, Microsoft Azure. All listed operating systems. See the table for which Enterprise Control Room versions.

Enterprise Control Room Version	Cloud			Data center
	Google Cloud Platform	Amazon Web Services	Microsoft Azure	On-premise server
Version 11.3.3	Y	Y	Y	Y
Version 11.3.2.3	N	Y	Y	Y
Version 11.3.2.2	N	Y	Y	Y
Version 11.3.2.1	N	Y	Y	Y
Version 11.3.2	N	Y	Y	Y
Version 11.3.1.4	N	N	Y	Y
Version 11.3.1.3	N	N	Y	Y
Version 11.3.1.2	N	N	Y	Y
Version 11.3.1.1	N	N	N	Y
Version 11.3.1	N	N	N	Y
Version 11.3	N	N	N	Y

## Enterprise client operating system compatibility

Enterprise client can be installed on machines running the following operating systems.

Windows version	Version editions
Server 2019 <sup>1,3</sup>	Standard and Datacenter
Server 2016 <sup>1,3</sup>	Standard and Datacenter
Server 2012 <sup>1</sup>	Standard
Server 2008 R2	Standard
Windows 10 <sup>1,2</sup>	Professional and Enterprise
Windows 8.1 and 8	Professional and Enterprise
Windows 7 SP1	Professional

### Enterprise client components

Bot Creator and Bot Runner are compatible with the same operating systems as Enterprise client.  
 (1, 2) Windows 10

- Automation using Apache Flex technology is not supported.
- Microsoft Edge Automation and triggers are not supported.

(1) Windows Server 2012:

Automation using Apache Flex technology is not supported.

(1, 3) Windows Server 2016:

- Automation using Apache Flex technology is not supported.
- As of Automation Anywhere Version 11.3.2, this is no longer a limitation on Enterprise client with Windows Server 2016.

For Windows Server 2016 on Automation Anywhere versions older than Version 11.3.2:

When installing Enterprise client, to enable the AutoLogin feature for a Logoff scenario, ensure that the lock screen appears and that the CTRL+ALT+DEL action does not appear on the lock screen. To ensure this:

- Enable the Interactive logon: Do not require Ctrl+Alt+Del option available under Local Security Policy > Local Policies > Security Options.
- Disable the 'Do not display the lock screen' option available under Local Group Policy > Computer Configuration > Administrative Templates > Control Panel > Personalization

## Enterprise client platform compatibility

Enterprise client versions support the listed operating systems on a variety of platforms:

Physical machines

See [Hardware requirements](#). All listed operating systems and Enterprise client versions.

Terminal servers

Using remote desktop (RDP). All listed operating systems and Enterprise client versions.

Virtual machines

Using Citrix XenApp, VMware Horizon Client. All listed operating systems. See the table for which Enterprise client versions.

Cloud servers

Using AWS, Google Chrome, Microsoft Azure. All listed operating systems. See the table for which Enterprise client versions.

Enterprise client Version	Cloud			VM		RDP	Physical
	Google Cloud Platform	Amazon Web Services	Microsoft Azure	VMware Horizon Client	Citrix XenApp	Microsoft Terminal Servers	Machine
Version 11.3.3	Y	Y	Y	Y	Y	Y	Y
Version 11.3.2.3	N	Y	Y	Y	Y	Y	Y
Version 11.3.2.2	N	Y	Y	Y	Y	Y	Y
Version 11.3.2.1	N	Y	Y	Y	Y	Y	Y
Version 11.3.2	N	Y	Y	Y	Y	Y	Y
Version 11.3.1.4	N	N	Y	Y	Y	Y	Y

Enterprise client Version	Cloud			VM		RDP	Physical
	Google Cloud Platform	Amazon Web Services	Microsoft Azure	VMware Horizon Client	Citrix XenApp	Microsoft Terminal Servers	Machine
Version 11.3.1.3	N	N	Y	Y	Y	Y	Y
Version 11.3.1.2	N	N	Y	Y	Y	Y	Y
Version 11.3.1.1	N	N	N	N	N	N	Y
Version 11.3.1	N	N	N	N	N	N	Y
Version 11.3	N	N	N	N	N	N	Y

- [Auto Login compatibility](#)

Bots can Auto Login to the listed operating systems and environments.

Related concepts

[Enterprise client installation](#)

Related reference

[Enterprise Control Room installation](#)

## Version 11.3.3 Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations in Version 11.3.3 for Automation Anywhere Enterprise Control Room, Enterprise client, and Bot Insight.

### New features

Enterprise Control Room new features	
Feature	Description
Bot Store integration	<ul style="list-style-type: none"> <li>All Enterprise Control Room users can log in and access the Bot Store from the Enterprise Control Room. See <a href="#">Accessing Bot Store</a>.</li> <li>New roles and permissions are available to allow users to access and download bots and Digital Workers from the Bot Store. See <a href="#">System created roles</a> and <a href="#">Feature Permissions for a Role</a>.</li> </ul>

Enterprise Control Room new features	
Feature	Description
	<ul style="list-style-type: none"> <li>View information about the bots downloaded from the Bot Store. See <a href="#">Downloaded bots from Bot Store</a>.</li> <li>Download bots and Digital Workers from the Bot Store to the Enterprise Control Room. See <a href="#">Downloading bots to Enterprise Control Room repository</a>.</li> <li>View in-progress activities and audit logs for the bots and Digital Workers downloaded from the Bot Store. See <a href="#">In progress activity</a> and <a href="#">Audit logs for bots downloaded from the Bot Store</a>.</li> <li>Run protected bots from the Enterprise Control Room. See <a href="#">Running protected bots</a>.</li> </ul>
Enhanced user interface to set the time value when scheduling a bot (Zendesk # 96099)	When scheduling a bot, you can set the Start and End time by selecting a time value from the drop-down list, which contains pre-defined time values in the 12-hour format at intervals of 15 minutes. This enables you to quickly select the time from the list, or manually set the time for the values that are not available. See <a href="#">Schedule a bot</a> .
Filter work item results (Zendesk # 151417)	<p>The Work Item Results column is introduced in the Work Items view table on the Queues page to quickly filter the work item results. You can use this to take the necessary actions on the queue tables.</p> <p>See <a href="#">Actions allowed on queue tables</a>.</p>
Filter the Start time and End time in the List work item API (Zendesk # 186813, 238660)	<p>To find specific information, you can now filter the Start time and End time columns when you use the List work item API.</p> <p>See <a href="#">List all work items in a queue</a>.</p>
Automatically reinstall Enterprise Control Room during repair or reinstall process	When repairing or reinstalling the Enterprise Control Room, after the un-installation completes, you do not have to manually run the setup file to reinstall the Enterprise Control Room. The re-installation process starts automatically using the previous settings. See

Enterprise Control Room new features	
Feature	Description
	<a href="#">Uninstall or repair Enterprise Control Room installation.</a>
Google Chrome support for MetaBot	MetaBot capabilities are supported in Google Chrome. See <a href="#">Supported browsers</a> .
Migrate version 10.x Historical activity to version 11.x	<p>Introduced the option to Include Historical Activity when migrating bots using the Bots and Schedules option. This option enables you to retain the task run history of the bots that need to be migrated to version 11.x. See <a href="#">Select bots to migrate</a>.</p> <p>After the migration process completes, you can view the status of the historical activity migration (success or failure) in the History tab of the View Migration page. See <a href="#">Analyze migration status</a>.</p>
Google Cloud Platform support for Enterprise Control Room cloud installation	Install Enterprise Control Room on a Google Cloud Platform instance running Microsoft Windows Server 2019, 2016, or 2012. See <a href="#">Installing Enterprise Control Room on Google Cloud Platform</a> .
Added TLS support for distributed caching and messaging communication across nodes in a cluster	<p>Distributed caching and messaging communication across nodes is now over TLS.</p> <p>Configurable properties enable you to selectively disable TLS in addition to disabling/enabling authentication.</p>
Mapping Active Directory (AD) to roles in Enterprise Control Room	You can map Active Directory (AD) security groups to roles in Enterprise Control Room. These roles provide access to Control Room objects, such as bots, folders, devices, credentials, and Credential Vault lockers. You can use this information to dynamically assign roles to users, depending on the AD groups that they belong to.

Enterprise client new features	
Feature	Description
Uninstall Flex plug-in using Command line	You can use the Control Panel or a command line interface to uninstall the Flex plug-in

Enterprise client new features	
Feature	Description
	installed by the Automation Anywhere Enterprise client. See <a href="#">Uninstall Plug-ins</a> .
Interactively capture objects from SAP GUI application	You can now interactively capture objects from the SAP GUI application using the GUI Automation command. This command enables you to capture objects with the click of a mouse.
Install Enterprise client chrome plug-in without internet access. (Zendesk # 125883, 174341)	You can use the command line interface to install the Enterprise client Google Chrome plug-in, even when you do not have internet access. See <a href="#">Install plug-ins in offline mode</a> .
Enable or disable ROI settings logs (Zendesk # 200865, 217246, 217939)	You can use the Enable or Disable ROI Settings Logs to maintain the performance level of Bot Runners. Disable the logs from Tools > Options > ROI Settings if you notice performance degradation on the Bot Runner machines. See <a href="#">Using ROI Settings</a> .
Bot Store integration	<ul style="list-style-type: none"> <li>• Create and store Digital Workers or bot packages in the default Bot Store folder. See <a href="#">Organizing Bot Store Digital Workers and bots</a>.</li> <li>• This enables you to configure the required parameters and bot codes, which are not exposed for the protected bots. Vendor IP or the IP of the original author of the bot is now secured when viewing and playing the protected bots downloaded from the Bot Store. The source code of the protected bot or MetaBot is also not exposed. However, you can configure the value of the variables used in the protected bot or MetaBot. See <a href="#">Viewing and playing protected bots</a>.</li> </ul>
Enterprise client and Remote Agent for Citrix are Citrix Ready certified	Automation Anywhere Remote Agent is now Citrix Ready certified. This certification is a validation of our product meeting the requirements set by Citrix for its partners. As an added benefit of the certification, we are now listed on the Citrix Ready Marketplace - a vital source for Citrix customers.

Enterprise client new features	
Feature	Description
Auto login in Citrix environment (Zendesk # 135938, 128709)	You can use the auto login feature to log into a Citrix environment if it has locked out or logged off. See <a href="#">Citrix Automation</a> .
Create zip package for the Bot Store or Digital Worker from Enterprise client	You can now seamlessly create a zip package for the Bot Store bot or Digital Worker from the Enterprise client instead of creating it manually from the File Explorer. The zip creation identifies all the required dependencies and creates a folder structure that is consistent with the Bot Store. You can now directly use the zip package and submit it to the Bot Store for the end users. See <a href="#">Creating a bot package</a> .
Mozilla Firefox plug-in support (Zendesk # 53882, 55279, 55653, 70621, 77096, 78264, 89835, 93333, 93913, 103955)	You can install the Mozilla Firefox plug-in that enables you to automate the HTML technology-based web applications that are launched using the Mozilla Firefox browser. See <a href="#">Install plug-ins using the command line</a> .
Email Trigger to support POP3 with SSL (Zendesk # 205859)	The Email Trigger action in the Trigger Manager now supports the POP3 protocol with the SSL connection. This support enhances the authentication for the Email trigger action.
Support for PowerBuilder platform 10.5 (Zendesk # 86557, 98160, 140835)	The Object Cloning command now supports the PowerBuilder platform 10.5. This enables you to capture and play all the control actions for the applications built on the PowerBuilder 10.5.
Select SOAP service URI for execution (Zendesk # 105937, 106452, 141496, 192347, 239224)	Introduced the Default, Dynamic, and Static options to Select URI for execution in the SOAP Web Service command. These options enable you to select the SOAP service endpoint URI that is required to run a bot. See <a href="#">Using the SOAP Web Service Command</a> .
Add Subject to Email Notification template (Zendesk # 98464)	Introduced support to add a customized Subject to the error email notification from the Error Handling command. You can also use the System Variables and User-defined Variables to define the subject. See <a href="#">Error Handling command</a> .
Google Cloud Platform support for Enterprise client cloud installation	Install Enterprise client on a Google Cloud Platform instance running Microsoft Windows Server 2019, 2016, or 2012. See <a href="#">Installing the Enterprise client</a> .

Enterprise client new features	
Feature	Description
Additional browser support for Object cloning and MetaBot	<p>HTML technology is now supported for Object cloning using Mozilla Firefox.</p> <p>MetaBot support for HTML and UIAutomation is also enabled for Google Chrome.</p>

Bot Insight new features	
Feature	Description
Bot Lifecycle Management support	<p>The Bot Lifecycle Management (BLM) utility now supports both PostgreSQL and Oracle databases.</p> <p>See <a href="#">Bot lifecycle management</a>.</p>
Bot Insight CoE Admin role	<p>Introduced the AAE_COE_Admin role. Use this role to view Default, Saved As, and Published CoE dashboards.</p> <p>See <a href="#">Roles</a>.</p>
Password encryption	All the passwords that are stored in the Bot Insight property files locations are encrypted.
Bot Velocity dashboard feature enhancement	The Bot Last Modified By column in the Home Bots Velocity dashboard provides information on the last user that modified the bot.
Service Insight Bot packaging	<p>The Service Insight bot is packaged along with the Automation Anywhere Enterprise client in the following location:</p> <p>My Tasks &gt; Service Insights</p> <p>When you install the Automation Anywhere Enterprise client, the Service Insight bot is installed by default. This bot collects real-time information from the Enterprise Control Room and provides best practices to increase the bot velocity.</p> <p>Note: You can also download the Service Insight bot from the <a href="#">Bot Store</a>.</p>
Managing CoE dashboards across environments	The Export and Import functions introduced in the CoE dashboard enable you to seamlessly move the business information and

Bot Insight new features	
Feature	Description
	<p>customized CoE dashboard configurations across different environments.</p> <p>See <a href="#">Managing CoE dashboards across environments</a>.</p>
New widgets in the Bots Dashboard	<p>The following widgets are added in the Bots Dashboard:</p> <ul style="list-style-type: none"> <li>• Bot Status</li> <li>• Top Failure Reasons</li> <li>• Upcoming Schedules</li> <li>• Home Bots Capacity Utilization</li> </ul>
New widgets in the Devices Dashboard	<p>The following widgets are added in the Devices Dashboard:</p> <ul style="list-style-type: none"> <li>• Device Status</li> <li>• Device Schedules</li> <li>• Top Error Messages</li> </ul>
ROI transaction count	<p>Data for failed and aborted transactions is logged in the CoE dashboard when the transaction count appears under Transaction Count.</p> <p>See <a href="#">Configuring a CoE dashboard</a>.</p>
Attended Bot runs transaction count	The individual manual run count of the bot runners are logged under Transaction Count.

## Changed features

Enterprise Control Room changed features	
Feature	Description
Upgrade the Enterprise Control Room with fewer inputs	You can upgrade the Enterprise Control Room with fewer input as the setup enables you to continue using the previous configurations such as the mode of setup and database type. You are, however, allowed to update the password on the service credentials page and database port number.

Enterprise Control Room changed features	
Feature	Description
View the In progress activity even when the run time window is hidden (Zendesk # 91292, 99402, 119115, 184415)	You can view the In progress automations in the Activity > In Progress page even if the Run Time window on the Bot Runner machine is hidden. See <a href="#">In progress activity</a> .
Add more columns to work item structure for viewing in Enterprise Control Room(Zendesk # 186809)	You can add a maximum of ten columns to a work item structure of the Enterprise Control Room. In the previous versions, a maximum of five columns were allowed.  See <a href="#">Define work item structure</a> .
Bot pool optimization in Workload Management (Zendesk # 118922, 127626, 128638, 131192, 174930, 199205, 226370, 228639, 239912, 184983)	Unused Bot Runners are optimally utilized from a bot pool when the work items are executed from multiple queues.  For example, two Bot Runners that have finished processing work items from Queue 1 are utilized to run work items from Queue 2 instead of waiting for Queue 1 to finish the deployment.
Ability to stop processing work items with Active status (Zendesk # 186806)	You can stop the processing of work items from the Activity > In Progress page for the bots that have an Active status and are running/processing on the Bot Runner machines.  See <a href="#">In progress activity</a> and <a href="#">View work items</a> .
Increased the Queue work item data length to more than 500 characters (Zendesk # 155236, 158033, 158349, 1871641)	A Work Item of a Queue can contain data having more than 500 characters.  See <a href="#">Define work item structure</a> .
Local bot run activity captured in Historical Activity page	The Historical Activity page captures the information on when a bot is run locally on Attended or Unattended Bot Runner and/or Bot Creator machines.  See <a href="#">Manage historical activity</a> .
Enhanced help experience with an upgraded documentation portal (Zendesk # 146697, 134731)	You can access the Enterprise Control Room help from an upgraded documentation portal - <a href="https://docs.automationanywhere.com/">https://docs.automationanywhere.com/</a> .

Enterprise client changed features	
Feature	Description
Flexibility to use any active port for Proxy Server Settings (Zendesk # 63470, 66971, 66990, 80179, 87506, 174323, 175312)	You have the flexibility to use any active Port number within the 0 through 65535 range for setting up a Proxy Server.  Also, when you alter any settings under Options, the application does not validate the Port number in the Advanced Settings.  See <a href="#">Using Advanced Settings</a> .
Save attachments containing a [TAB] in its name (Zendesk # 222561)	You can save attachments with names that contain a TAB when using the Email Automation command.  See <a href="#">Email Automation command</a> .
Options to specify technology of the captured object	The Object Cloning command enables you to select an option to specify the technology of the object being captured.
Support for 3.0.21.0 version of SAP DLL (Zendesk # 113499, 119505, 120055, 169238, 228083)	The 3.0.21.0 version of the SAP DLL is supported. This enables you to import and use the SAP BAPIs in the Enterprise client.
Save Response header information in Array and Dictionary type variable (Zendesk # 52357, 77979, 81835, 95840, 130176, 181871)	You can now save the response header information in the REST Web Service command to an Array and a Dictionary type variable.  See <a href="#">Using the REST Web Service Command</a> .
VT220 support in Terminal Emulator command (Zendesk # 49318, 191110)	You can automate processes using a VT220 terminal when using the Terminal Emulator command.  See <a href="#">Terminal Emulator command</a> .
Function key [Fn] support in Terminal Emulator command (Zendesk # 54251, 54989, 97573, 99677, 105183, 108375, 109619, 120176, 120235, 146934, 183638, 191110, 206109)	Function key [Fn] support introduced to automate processes using ANSI and VT100 terminals with Advanced Technology in the Terminal Emulator command.  See <a href="#">Terminal Emulator command</a> .
Support for array and dictionary variables (Zendesk # 75028, 141270, 229010)	In MetaBot Logic, array variables are visible from the output variable drop-down menu.

Enterprise client changed features	
Feature	Description
	When a command returns an array type variable, you can store it in the value type variable. In this condition, a separator must be used. The available separators are space (default value), comma, semicolon, hyphen, colon, and period.
Viewing MetaBot text without MetaBot Logic (Zendesk # 98669)	You can now view the MetaBot text and parameters in the Workbench Editor without first opening the MetaBot Logic.
Monitoring mechanism to detect connectivity issues for Files and Folders Triggers (Zendesk # 115778, 135132, 192678, 196610)	Connectivity to remote files and folders used in triggers can now be monitored along with ability to retry connection upon failure.
Credential Vault variable format updated (Zendesk # 98669)	<p>Credential Vault variables are formatted correctly when using the Run Logic command in a MetaBot, and when passing the variable as an input or output parameter. For example:</p> <pre>&lt;InputParameters&gt;   &lt;Parameter&gt;     &lt;Name&gt;\$Vinputpara\$&lt;/Name&gt;     &lt;Value&gt;\$Vmihirinput (Vinput) \$&lt;/Value&gt;     &lt;Type&gt;Value&lt;/Type&gt;   &lt;/Parameter&gt; &lt;/InputParameters&gt;</pre>
Enhanced help experience with an upgraded documentation portal (Zendesk # 146697, 134731)	You can access the Enterprise client help from an upgraded documentation portal - <a href="https://docs.automationanywhere.com/">https://docs.automationanywhere.com/</a> .
Support for configuration in AASetting.xml file for the Excel command options (Zendesk #211964, 216478)	To retain the legacy behavior of the Contains Header and the Excel Cell Row options of the Excel command when used in a loop, a new configuration is introduced in the AASettings.xml file of Automation Anywhere Enterprise client, as follows:
	<pre>&lt;retainexcelcellrowlegacybehavior&gt;</pre>

Enterprise client changed features	
Feature	Description
	See <a href="#">Update Enterprise client settings file for Excel command.</a>

Bot Insight changed features	
Feature	Description
Transaction Status API	<p>The Bot Insight transaction status API retrieves the transaction status of each function:</p> <ul style="list-style-type: none"> <li>• In progress</li> <li>• Completed Successfully</li> <li>• Aborted</li> <li>• Failed</li> <li>• Timed Out</li> </ul> <p>See <a href="#">Bot Insight task log data</a>.</p>
Transaction count display	In the Business Information dashboard, the Units menu lists the transaction count and the transactions conducted per hour details by default.
Operations dashboard Role Based Access Control (RBAC)	The <code>USER_RBAC</code> and <code>DEVICE_RBAC</code> files are modified to reflect the appropriate RBAC in the dashboards after you restart the Bot Insight services.

## Fixed features

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
198606, 205967	If you are granted the View my in progress activity, View my bot, and Run bot permissions, the insufficient permission message is not shown when you access the Historical activity details page.
164510, 207614	Credential variables are processed correctly with the Authentication API POST parameters when the request is run in a task.
203133	Work Load automations resume automatically when new work items are added to a queue. A queue is picked up in the next round or when the work items are picked up on a priority basis

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
--	even after the work item consumption is manually stopped.

Enterprise client fixed features	
Zendesk Ticket ID	Description
187611, 215676, 217196, 226990	You can now delete an XML file after closing the XML session using the End XML Session operation.
195881	When an automation task containing a Variable Operation command is saved as an XML file, the disabled status appears in the XML file.
184641	When an array variable is reinitialized using the Variable Operation command in an automation task after connecting to a database instance, and the result set is empty, array elements now work as intended and do not return an exception.
205919, 211431	A configuration option is provided to ensure that the characters are read correctly after using the PDF Integration command with the Extract Text option. The configuration option is to set the flag for <code>ReadWithSystemEncoding</code> to "False" in the AA.Settings.xml file.
185559	A configuration option is provided to ensure that the Email Automation command reads the email subject containing a combination of encoded and plain text accurately.  The configuration change is to include the following within the <code>&lt;player&gt;</code> tag in the AA.Settings.xml file:  <code>&lt;options&gt;&lt;emailautomation&gt;&lt;decodeentiretext&gt;True&lt;/decodeentiretext&gt; &lt;/emailautomation&gt;&lt;/options&gt;</code>
213611, 225573	You can run a TaskBot that uses a VB script containing more than 4136 characters.

Enterprise client fixed features	
Zendesk Ticket ID	Description
209052	In the Excel command for the Get cell option, when you reinitiate an Array type variable, the value in the variable is available and is not erratic when you run the TaskBot.
96847	The page orientation in a PDF file does not impact data extraction when you use the Extract Form Fields option in the PDF Integration command.
208710	XML is correctly exported for a Taskbot when the Error Handling, Loop, or If/Else conditional commands are deleted or disabled.
182168	After upgrading to the Automation Anywhere 11.x version, the Unzip File(s) option in the Error Handling command enables you to overwrite the existing files when it is used in the error handling block.
153088	A black screen is not shown when the TaskBots that are queued to run on a Bot Runner are deployed and run successfully using remote sessions.
136706	The Visual log file of the Report Designer now shows the correct From and To dates.
136833	Consider an automation task that uses more than one Credential Vault variable with the same name but a different combination of upper and lower case characters, and with one of the Credential Vault variables no longer existing and the command using it is disabled. Such a task now runs correctly on the local machine or if it is deployed or scheduled from the Enterprise Control Room on a Bot Runner machine with or without the Autologin feature enabled.
188292, 209531	With the Advanced Technology option enabled in the Terminal Emulator command, you can now page up and page down correctly using the function keys KEY_PGUP and KEY_PGDOWN respectively for the TN3270 and TN5250 terminal types.
-	The Terminal Emulator command now supports Japanese text when used with the Send Text option using DBCS encoding for the

Enterprise client fixed features	
Zendesk Ticket ID	Description
	VT Series terminal types with Advanced Technology.
155093, 183664	The Insert Keystrokes command now works properly with the TN3270 Terminal Emulator using the Advanced Technology. The Send Text option sends all the specified text on the Terminal Emulator screen before the next command is executed.
194092	In the Database command, the Stored Procedure option without parameters enables you to execute the tasks without any object reference errors.
-	The 'webcrsvc/clients/getall' API endpoint now enforces RBAC to restrict any unauthorized access to the Client's information that is registered with the Control Room.
205904	The MetaBot focus is not lost when task execution completes. You can now configure a property to enable or disable the setfocus API.
-	In Oracle Java, fixed the issue when scrolling SelectItemByText from the drop-down menu.
137566, 197738	MetaBot screen capture for Oracle forms embedded in the Microsoft Internet Explore screen now captures the hidden objects after adding the capturehiddenobjects tag in the AA.Settings.xml file.
198505, 221432	The Object Cloning command does not display an error if you have specified 0 in the Wait for the object to exist field.
161504	Object Cloning works when you migrate bots created in version 10.7.0 to Version 11.3.3.
174893	The Image recognition command does not realign itself when you click the Quick Test option after capturing an image.
211752	You can use the .xlsb file with an array type variable to use the values available in that file as an input for the variable.
-	In the Rest Web service command, a Bot Creator is now not allowed to append any

Enterprise client fixed features	
Zendesk Ticket ID	Description
–	other text or local or system variable to the Credential Variable.
195836	The To and From email fields for the MetaBot Logic are now populated when Tools > Options > Email Settings > MetaBot Logic tab is enabled and saved.
–	For a MetaBot, when using an Oracle Java application, an error message is not shown when an invalid index name or an invalid item number is entered in the fields.
–	The mouse down action now gets the correct status when capturing an object in Citrix XenApp.
–	If you run the Enterprise client installer multiple times, it opens multiple installer instances, but you are allowed to install the Enterprise client using only one instance. If you try to install the setup using another instance, an error message appears.
3228	The TaskBot log now captures the Timeout and Last Run Time data when the TaskBot times out during execution. You can view the data using the View Log option from the Properties tab.
3418	When you edit a TaskBot that is recorded using the Web Recorder with Pattern-based data to extract the data, the Append to an already existing csv file option is not selected again by default if it was disabled during recording.
161012, 190195, 219504	The disabled run time window now does not interfere with the automation of applications that use the Object Cloning command when a TaskBot is executed.

Bot Insight fixed features	
Zendesk Ticket ID	Description
198111	<p>Bot Insight now supports apostrophes in dashboard titles.</p>
-	<p>Transaction count display</p> <p>In the Business Information dashboard, the Units menu lists the transaction count and transactions conducted per hour details by default.</p>

## Security fixes

There are no security fixes listed for Enterprise client in this version.

Enterprise Control Room security fixes	
Zendesk Ticket ID	Description
130121, 145734, 150481, 162605, 169866 198766, 205937	Updated the underlying Elasticsearch version to 6.4.3.
129996, 138976	Implemented the referrer policy configuration for Enterprise Control Room.

Bot Insight security fixes	
Zendesk Ticket ID	Description and Fix
	<p>All the passwords that are stored in the following locations are encrypted:</p> <ul style="list-style-type: none"> <li>• Bot Insight property files</li> <li>• Bot Insight database</li> </ul>
155901, 179991, 188647	Passwords are now encrypted in the Bot Insight configuration files. The Zoomdata.property file contains the encrypted password for SQL database.

## Deprecated features

Enterprise Control Room deprecated features	
Feature	Description
Device time-out parameter from Work Load Management properties file (Zendesk # 186808)	The Device time-out parameter is deprecated from the Work Load Management properties file that was globally applicable. This was not the optimal option because the processing time of automations varies for different queues.

Enterprise client deprecated features	
Feature	Description
User interface language selection	French language is deprecated for the Enterprise client user interface. Now, you cannot select French in the setup file when you install the application.

## Known limitations

### Enterprise Control Room known limitations

- The connection to an Apache Ignite server of a Enterprise Control Room cluster is automatically restored after the network is disrupted; however, the connection to the other server nodes is not restored and the servers appear disconnected.

To ensure all the nodes are in sync, manually restart the Automation Anywhere Elastic Search Service from the Task Manager Services window.

- It is recommended to delete a repository from the Visual SVN Server instead of deleting the default folder of the SVN repository in the Enterprise Control Room that is enabled for version control.
- Bot Store integration - Dependent files from the My Docs, My Exe, and My Script folders are not included as manual dependencies in the bots that are accessible from the Bot Store. This means that the Manual Dependency API is also not supported.

To include the dependent files for bot deployment, add the files in the Bot Store folder when you create a bot that is to be uploaded to the Bot Store.

- Pagination is not available in the My Downloads page in the Bot Store tab.
- When you migrate a custom role to Version 11.3.3, and this role is granted permission to the My Tasks folder, the permissions are not applied to the Bot Store folder.
- When you refresh the Download to my bots page, the name of the bot you are downloading disappears and the Download to my bots option is disabled.
- If you have set a production version to a parent bot and did not set the production version on the child bot, the protection type status of the child bot and the bots within the child bot is not displayed even if they are protected.
- The progress status for a Repeat scheduled event is intermittently captured on the In Progress Activity screen. As a workaround, you can refresh the page.
- If you delete any bot, the historical data associated with that bot is removed.

- The Folders on the Bots permission page need to be collapsed and expanded manually when you are in the process of creating a role to ensure newly uploaded child level folders that are added concurrently by other users can be viewed under the parent folder and included when assigning the Bot level permissions.
- To export the migration details to a csv file, use the Export details... button given at the row level for single migration record from the main Migration page instead of the Export details... button on the View migration page.

#### Enterprise client known limitations

- Bot Store integration - Dependent files that are either not referenced from the correct folder or missing from the physical location show the Protection Type as follows when you upload to or download from the Enterprise Control Room:
  - Protection Type column is displayed.  
If you are uploading or downloading a task that has dependencies and is available within the Bot Store folder.
  - Protection Type column is not displayed.  
If you are uploading or downloading a task that has dependencies and is available outside the Bot Store folder.
- You cannot capture objects based on Flex, Java, and Silverlight technologies from Google Chrome.
- Terminal Emulator command -
  - For the ANSI or VT Series terminal type with Advanced Technology, when you use the [Enter] key, the bot execution moves to the next command before the next screen appears. It is recommended that you split the text and key in two separate Send Text commands in your TaskBot.
  - For ANSI terminal type, an additional row is displayed with Advanced Technology as compared to the Legacy technology.
- If the 'Object reference not set to an Instance of an Object' error message appears when you open the Workbench for the Enterprise client that is installed on the Google Cloud Platform, you must reinstall the same Enterprise client after uninstalling it to fix this issue.
- GUI Automation command -
  - You cannot use wildcard characters to specify the title of the SAP window from which you want to capture an object.
  - After capturing an object from the SAP window, the focus does not shift back to the Enterprise client. Click the Enterprise client icon on the task bar to navigate back to the Enterprise client.
- In the Rest Web Service command, you may not be able to add the local variables and text with the other local variables in Request > Header using F2 after you have used the Credential Variable. In that case, clear the textbox that has the Credential Variable and then try to add any local variable.
- In the Object Cloning command, some actions that are based on the PowerBuilder platform 10.5 may not function as expected. See the following examples:
  - The Set Text and the Append Text actions may require a delay to function properly.
  - The Page Tab action may require input using the Keystrokes such as [CTRL DOWN][ALT DOWN]TAB[CTRL UP][ALT UP] to select the next tab.
- Third party integration commands, such as SAP, Zip-unzip, PGP, Terminal Emulator, and Send Email in Automation Anywhere do not work optimally on a machine or a newly configured Virtual Machine (VM) that does not have the required Primary Interop Assemblies (PIA) redistributables. Typically, the PIA redistributables are automatically installed; however, they need to be separately installed if you did not install the Microsoft .NET Framework package before you installed Microsoft Office.
- As a work around, copy the stdole.dll file to either of the following paths:

```
<your drive>:\Windows\assembly\GAC
```

```
<Automation Anywhere installation path>\Client
```

Tip: Copy the file from an existing <your drive>:\Windows\assembly\GAC of a VM or machine where Microsoft Office is installed. See <https://docs.microsoft.com/en-us/visualstudio/vsto/how-to-install-office-primary-interop-assemblies?view=vs-2019>.

#### Bot Insight known limitations

- The following widgets are not supported in the Bots Dashboard:
  - Bot Heartbeat
  - MVP Bots
- The following widgets are not supported in the Devices Dashboard:
  - CPU Utilization
  - Memory Utilization
  - HDD Utilization
  - Upcoming Device Utilization
  - Failure Analysis
- Use the following default port configuration to ensure that Bot Insight communicates seamlessly with Zoomdata:
  - Port 8118 - Elasticsearch
  - Port 8291 - EDC (MSSQL/Oracle)

See [Configuring ports for Zoomdata](#).

#### Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.2.3 Release Notes

These release notes contain new features, changed features, and known limitations in Version 11.3.2.3 of Automation Anywhere Enterprise client. Only the Enterprise client patch installer is available in this release.

### New features

There are no new features introduced for Enterprise Control Room in this version.

There are no new features introduced for Bot Insight in this version.

Enterprise client new features	
Feature	Description
Save Response header information in Array type variable	<p>You can now save the response header information in the REST Web Service command to an Array type variable.</p> <p>See <a href="#">Using the REST Web Service Command</a>.</p>

## Changed features

There are no changed features introduced for Enterprise Control Room in this version.

There are no changed features introduced for Bot Insight in this version.

Enterprise client changed features	
Feature	Description
Support for 3.0.21.0 version of SAP DLL (Zendesk # 113499, 119505, 120055, 169238, 228083)	Version 3.0.21.0 of the SAP DLL is supported. This enables you to import and use the SAP BAPIs in the Enterprise client.

## Fixed features

There are no fixed features introduced in this version.

## Security fixes

There are no security fixes in this version.

## Deprecated features

No deprecated features are introduced in this version.

## Known limitations

### Enterprise client known limitations

- In the Send Key command, KEY\_CLEAR behaves like KEY\_ENTER, and the output differs from the legacy technology. This occurs when using the Terminal Emulator ANSI and VT100 terminal types.

### Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.2.2 Release Notes

These release notes contain fixed features and security fixes introduced in Version 11.3.2.2 for Automation Anywhere Enterprise Control Room, Enterprise client, and Bot Insight.

### New features

There are no new features introduced in this version.

### Changed features

There are no changed features in this version.

### Fixed features

There are no fixed features listed for Bot Insight in this version.

Enterprise Control Room fixed features	
Zendesk ticket ID	Description
225358	<p>During LDAP authentication, the Auto Discovery feature does not fail because it skips the inaccessible domains and moves to the next domain, thereby, ensuring that it discovers all the other domains. The following also improves domain discovery:</p> <ul style="list-style-type: none"> <li>Support for the trusted domains in the next tier along with the direct trusted domains.</li> <li>Support to the transitive trust that enables discovery of all the domains in all the forests.</li> </ul>
195634	<p>Users can now upload the bots from the Automation Anywhere Enterprise client using the white-listed file extensions even when the Automation Anywhere Control Room Caching service is restarted.</p>

Enterprise client fixed features	
Zendesk ticket ID	Description
194092	In the Database command, the Stored Procedure option without parameters enables

Enterprise client fixed features	
Zendesk ticket ID	Description
	the users to properly run the tasks without displaying any object reference error.

## Security fixes

There are no security fixes listed for Enterprise Control Room in this version.

There are no security fixes listed for Enterprise client in this version.

Bot Insight security fixes	
Zendesk ticket ID	Description
--	<p>Zoomdata version 3.7.8 includes security vulnerabilities for the following components:</p> <ul style="list-style-type: none"> <li>• Apache ActiveMQ</li> <li>• Jackson-databind</li> <li>• Apache Xerces2</li> <li>• Apache Common Collections</li> </ul> <p>Resolution: Update to the Zoomdata version 3.7.15.</p>

## Deprecated features

There are no deprecated features listed for this version.

## Known limitations

Enterprise client known limitations

- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.2.1 Release Notes

These release notes contain changed features, fixed features, and security fixes introduced in Version 11.3.2.1 for Automation Anywhere Enterprise Control Room and Enterprise client.

### New features

No new features are introduced in this version.

### Changed features

Enterprise client changed features	
Zendesk ticket ID	Description
130009	The Machine variable now returns the full name of the computer even if the name is longer than 15 characters.

### Fixed features

Enterprise Control Room fixed features	
Zendesk ticket ID	Description
108985, 147958, 154301, 166711	The Enterprise Control Room server times out and displays a time-out error to the user when using the Export and Import bot options in the Bot Lifecycle Management module.
170349, 129571	After upgrading to Version 11.3.1 or Version 11.3.1.1, the CPU usage reaches 100% because of insufficient SQL queries on the Enterprise Control Room dashboards. This is fixed in Version 11.3.2.1.

Enterprise client fixed features	
Zendesk ticket ID	Description
--	When migrating a task with the SOAP Web Service command from the previous version 10.5.10 or 10.5.104 to 10.5.107 or 11.3.2.1 version, the WSDL associated with the SOAP command generates the expected output.
--	In the Terminal Emulator command > Advanced Technology, you can now page up and page down correctly using the function keys KEY_PGUP and KEY_PGDOWN

Enterprise client fixed features	
Zendesk ticket ID	Description
--	respectively for the TN3270 and TN5250 terminal types.
--	In the Email Automation command (IMAP, POP3), an email message containing images in the email body is shown in plain text or HTML format.
--	The Run functionality remains disabled until the automation task is saved.
--	TaskBots created using the Object Cloning command with the Select Item by Text or Select Item by Index options to capture data from the drop-down list work as expected.
123966	In the Insert Keystroke command, when setting a string value using the variable, the letters repeating consecutively do not skip.
157895, 175948, 182139, 184058, 194965	In the Variable Operation command, when doing a mathematical operation using the System Variables (for example: \$Date\$, \$Day \$), you now get the same result whether you include a space or not.
--	The Append Text action for the field that requires a password as input, which is captured from a window in a Java-based application using the Object Cloning command, now does not append the data twice.
157896	The Object Cloning command used to capture the pop-up window in a Java-based application now captures the object properties correctly for the selected object instead of the parent object when the task with this command is run.
167714	After upgrading Enterprise client to Version 11.3.1.2, the MetaBots created by capturing the Custom Objects in the previous versions now work as expected without any errors.
194226	In the Launch Website command, URLs that have the www missing start properly in Internet Explorer. Also, http:// is not automatically inserted after http:// when you run the automation.
124346	You can now view, add, edit, and delete monthly schedules in the Schedule Manager,

Enterprise client fixed features	
Zendesk ticket ID	Description
	even when the operating system is not in English.
171550	When executing a command, the player now displays an error message only if the target application does not return to the Responding state within the specified time-out period.
148247	When a user deploys or runs the same task that is already running, the second instance is placed in a queue. When the first task completes, the task in the queue starts and completes successfully, even if it contains Java-based Object Cloning commands or MetaBots.
178856, 180193	In the XML command, when you write the XML content to a file using Save Session Data, the XML file is created and encoded with UTF-8 and not with UTF-8 BOM.
--	In MetaBot Screen Configuration, the screen displays the first object listed in the Object List panel and the list is refreshed when you select another object from a new screen.
--	When you open a MetaBot Logic that has a front slash (/) in its name, the window title in the <a href="#">Workbench</a> appears correctly.
--	In a MetaBot, when you Calibrate screens, the NAMELESS objects now do not show up as new objects in the application calibration results.
--	In a MetaBot Logic, when you use the Mask option for SetText and AppendText of the Import Dataset command, the text is not shown when you save the Logic in the Workbench and run it.
--	The Workbench now does not pause or stop responding when you press an arrow key on the keyboard when using the SAP Integration command.

## Security fixes

Enterprise Control Room security fixes	
Zendesk ticket ID	Description
188276	<p>Hijacking the Control Room session, and tampering with the JSON file to modify the role may result in a privilege escalation (privilege to view, not change) and data disclosure in the Create User page.</p> <p>Resolution: Privileges are now applied on the API endpoint to prevent access to data on the Create User page.</p>

## Deprecated features

No features are deprecated in this version.

## Known limitations

### Enterprise Control Room known limitations

The MVP Bots widget is not available in the Bots dashboard.

### Enterprise client known limitations

- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

### Related reference

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.2 Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations introduced in Version 11.3.2 for Automation Anywhere Enterprise Control Room, Enterprise client, and Bot Insight.

## New features

Enterprise Control Room new features	
Feature	Description
Automation Anywhere Enterprise Control Room user interface localization	A Control Room user can change the language of the application's user interface by selecting English (United States), French, Japanese, and Korean from the Control Room. See <a href="#">Enterprise Control Room interface overview</a> .
Password type attribute in Credential Vault (Zendesk # 48249, 49478,52363, 62880, 65358, 84852,100452, 138760, 138779, 141926, 178161)	When creating a credential, you can now mark a specific attribute as a password type to ensure that a password-type attribute selection can only be made from the password field in the commands supporting the Credential Vault variables in the Enterprise client interface. This feature enhances the security of credential variables because the password-type attributes are not exposed and the value cannot be printed in a plain text application. Note: Existing bot users must modify their credential variable definition to use this feature. However, the bots require no modification.  See <a href="#">Create a credential</a> .
Automatically discover domains and sites across single or multi-forest environments for Active Directory configuration.	Introduced support for automatically discovering domains and sites by the Enterprise Control Room when the administrator configures or updates Active Directory authentication. See <a href="#">Configuring Enterprise Control Room for Active Directory: auto mode</a> , <a href="#">Configuring Active Directory Settings</a> , <a href="#">Reset LDAP user credentials</a>
Added API to get the Scheduled Activity list in the Enterprise Control Room	Introduced an API to get the Scheduled Activity list, also available from the Activity > Scheduled page of the Enterprise Control Room.
Provision to communicate with changed database password without reinstalling the Enterprise Control Room (Zendesk #124537)	When the database password is changed, the Automation Anywhere Enterprise can now communicate with the database without reinstalling the Enterprise Control Room.
Forward Audit Log entries to remote Syslog server(s) (Zendesk # 132247, 145180, 146118)	You can now configure Enterprise Control Room to forward all Audit Log entries in Syslog format to a remote Syslog server. See <a href="#">Configuring Syslog service</a> .

Enterprise Control Room new features	
Feature	Description
Role-based access to generate API key for Authentication	<ul style="list-style-type: none"> <li>Introduced role-based access to generate an API key for authentication. See <a href="#">Feature permissions for a role</a>.</li> <li>The validity of the API key for authentication is controlled from the Enterprise Control Room Settings page. See <a href="#">Configuration settings</a>.</li> <li>Enterprise Control Room users with appropriate permissions can generate the API key from their user profile page. See <a href="#">Profile management</a>.</li> </ul>
Configure callback URLs for the Bot Deployment API to send bot execution status and bot output	Enterprise Control Room administrators can now configure callback URLs for the Bot Deployment API on the Enterprise Control Room Settings page. Use the callback URLs to send the bot success, failure, and reason for failure after the bot finishes execution. See <a href="#">Configuration settings</a> .
Tag variables in a Bot for data output	Introduced a setting-based API for bot deployment so a Bot Creator can tag variables in a bot for data output.
View installed database details	The Enterprise Control Room settings page now shows the selected database type and the corresponding details. See <a href="#">Enterprise Control Room Database</a> .

Enterprise client new features	
Feature	Description
Support to recognize Asian languages using Automation Anywhere Enterprise ABBY OCR engine. (Zendesk # 137375)	Automation Anywhere Enterprise with ABBY OCR engine is now able to recognize Asian languages like Korean.
Password type attribute in Credential Vault supported commands (Zendesk # 48249, 49478, 52363, 62880, 65358, 84852, 100452, 138760, 138779, 141926, 178161)	You can now ensure that when creating a credential in the Enterprise Control Room, a password-type attribute can only be selected from a password field in the commands supporting Credential Vault variables, by selecting the This is a password attribute. This feature enhances the security of credential variables because the password-type attributes are not exposed and their values cannot be printed in a plain text application.

Enterprise client new features	
Feature	Description
Override default browser and choose browser to use (Zendesk #109820, 26502)	<p>Using the Override default browser option in the Launch Website command, a bot developer can now choose the browser to use and override the default browser setting of the system.</p> <p>The supported browsers are Google Chrome, Microsoft Internet Explorer, and Microsoft Edge. See <a href="#">Launch Website command</a>.</p>
Extract custom table control from Flex application	The Object cloning command now enables you to extract the custom table control from the specific Flex application and export it to a .CSV file.
Switch Terminal Emulator logs generation	You can now enable and disable the generation of Terminal Emulator logs for mainframe terminals using Advanced Technology during bot execution to capture only the required logs to share for analysis. This preserves user-sensitive information and does not capture the username and password.
Support SOAP Version 1.2 in SOAP Web Service command	The SOAP Web Service command now supports SOAP Version 1.2, which uses the content type 'application/soap+xml' and charset 'utf-8', in addition to SOAP Version 1.1, which uses the content type 'text/xml'. You can now specify the SOAP Version to use in the SOAP Web Service command to call the corresponding web service instead of writing a separate JavaScript to call the same web service.
Improved action of MetaBot with Outlook web application	You can now capture the Microsoft Outlook web application using a MetaBot and do a Click using MetaBot Logic.
Add screen using MetaBot for Microsoft Outlook 365 with IE browser	The Add screen feature using MetaBot is now improved for Microsoft Outlook 365 with Microsoft Internet Explorer.
Install Flex plug-in supported files in approved Microsoft directory	<p>The Flex plug-in is now installed in the approved Microsoft directory, that is, the Client installation folder instead of "C:\users\&lt;username&gt;\AutomationAnywhere\"</p> <p>in the following files:</p>

Enterprise client new features	
Feature	Description
	<ul style="list-style-type: none"> <li>AAMainLoader.html</li> <li>AAMainLoader.swf</li> <li>swfobject.js</li> </ul>
Option to regularly clean up Terminal Emulator logs	<p>You can now clean up the Terminal Emulator log at specific intervals to optimize disk space. For example, if you set an interval of seven days, older log files are deleted during cleanup.</p> <p>Valid interval ranges: 1 through 60 days Default: 7 days.</p>
Mutual authentication using Access Manager Reverse Proxy server	<ul style="list-style-type: none"> <li>You can now configure an Access Manager Reverse Proxy server, for example, the IBM WebSEAL, between the Automation Anywhere Enterprise client and Enterprise Control Room for secure communication.</li> <li>The client certificate authentication mechanism is used for the first-time authentication of Automation Anywhere Enterprise client.</li> </ul> <p>See <a href="#">Configuring Access Manager Reverse Proxy</a>.</p>
Object Cloning using the Remote Agent for Citrix	<p>The Remote Agent for Citrix enables you to use the Object Cloning command to capture objects from the applications that are installed on a Citrix environment, even when the Enterprise client is installed outside the Citrix environment. See <a href="#">Object Cloning command</a>.</p>

Bot Insight new features	
Feature	Description
Bot Insight Localization	<p>Bot Insight is now available in the following 14 languages:</p> <p>Arabic, Chinese (Simplified), Chinese (Traditional), Dutch, English, French, German,</p>

Bot Insight new features	
Feature	Description
	<p>Italian, Japanese, Korean, Polish, Portuguese (Brazil), Spanish (Latin America), and Turkish.</p> <p>Bot Insight automatically detects your locale and if it finds a match, it translates all the UI elements to its appropriate language.</p>
CoE Dashboard	<ul style="list-style-type: none"> <li>Added Units as a measurement for ROI. You can now calculate the ROI based on the transactions processed by the bots. Note: If you are upgrading to Version 11.3.2, you must run the new analytic tasks and regenerate the CoE dashboard to reflect the new changes.</li> <li>Added a quick link on the Business Information section for consumers to view the published dashboards corresponding to a bot. This is very useful for analyzing the processed transactions.</li> </ul>
Bot Insight APIs	<ul style="list-style-type: none"> <li>Bot Insight v2 APIs are now available for Control Room users. These APIs are backward-compatible. You can use the Bot Insight APIs to either push the data logged by Bot Insight to third-party applications, for example, Tableau, PowerBI, and so on, or use with bots to make them data-driven and add more power to the business rules.</li> <li>Added From and To Date to add more flexibility to retrieving data from the APIs.</li> </ul>

## Changed features

Enterprise Control Room changed features	
Feature	Description
Repair Enterprise Control Room using the setup file	You can now Repair an instance of the Enterprise Control Room using the setup file instead of using the option from the Control Panel.
Enhanced Control Room security questions capability	To align the behavior and availability of security questions with the organization's security

Enterprise Control Room changed features	
Feature	Description
	<p>policy, the following enhancements are available:</p> <ol style="list-style-type: none"> <li>1. Now complete a CAPTCHA text to log in to an Automation Anywhere Enterprise Control Room instance after three incorrect attempts at answering the security questions. See <a href="#">Log on to Enterprise Control Room hosted in Non-Active Directory mode</a>.</li> <li>2. If you have manage settings permissions, you are allowed to modify the global security-related policy from the Control Room &gt; Administration Settings &gt; Email tab. See <a href="#">Email settings</a>.</li> </ol>
Bots and users associated with a schedule cannot be deleted	You are not allowed to delete a bot/user listed in one or more active or inactive schedules. You must first delete the schedule. See <a href="#">Delete bot(s) and folder(s)</a> and <a href="#">Delete user</a> .
Minimum hardware requirement checks for Enterprise installation	<p>When installing the Enterprise application, the installer now detects whether the system used for installation meets the minimum hardware requirements of CPU, RAM, and free hard disk space in addition to the minimum supported operating system. If any of the requirements are not met, the installer warns the user to be aware before continuing with the installation.</p> <p>See <a href="#">Installing Enterprise Control Room using Custom mode</a>, <a href="#">Installing Enterprise Control Room using Express mode</a>, <a href="#">Enterprise Control Room prerequisites</a>.</p>
Separate View roles and Manage roles permission (Zendesk #92994)	<p>An Enterprise Control Room administrator can now give separate View roles and Manage roles permissions to a user. This was previously governed by a single View and manage roles permission.</p> <p>The separation of permissions enables a reduction in errors when validating many roles.</p> <p>To maintain backward compatibility, existing Enterprise Control Room users are assigned both view and manage permissions, by default. See <a href="#">Feature Permissions for a Role</a>.</p>

Enterprise Control Room changed features	
Feature	Description
Configure callback URLs for Bot deployment API	An Enterprise Control Room administrator can now configure known callback URLs for bot deployment APIs in Enterprise Control Room Settings. See <a href="#">Configuration settings</a> .
Enterprise Control Room APIs enabled for Single Sign-On (Zendesk # 115353, 132789, 138782)	You can now use the APIs for an Enterprise Control Room configured in a Single Sign-On environment.
Stop an automation task remotely from the Enterprise Control Room (Zendesk #63566, 69928)	You can now stop an automation task running on a Bot Runner machine, remotely from the Enterprise Control Room instead of logging in to the Bot Runner machine, even if it is paused for input or because of an error or to show a message. See <a href="#">Stopping a task manually</a> .
wlm.properties file automatically installed from Enterprise Control Room setup file	The wlm.properties file is automatically installed when you run the Enterprise Control Room installer setup file. It had to be manually placed in the application path in Version 11.3.1.2. See <a href="#">Sample Workload Management properties file</a> for more information.

Enterprise client changed features	
Feature	Description
ABBYY OCR engine as default	The ABBYY Fine Reader Engine v12 engine is now installed with the Enterprise client Version 11.3.2 by default and does not require a separate installation. See <a href="#">Configuring ABBYY for Automation Anywhere</a> . ABBYY is the default OCR engine for the Enterprise client. Note: When you upgrade to Enterprise client Version 11.3.2, the existing bots continue to run with the configured OCR engine. To use ABBYY as the OCR engine, you must edit the bot configuration.
Consolidated logs view in Automation Anywhere Enterprise Diagnostic Utility	The Automation Anywhere Diagnostic Utility shows the logs used for analysis in a consolidated form in the new Merged.log tab. See <a href="#">Automation Anywhere Diagnostic Utility</a> .
Change variable value for WSDL URI (Zendesk #69474)	In the Build SOAP Web Service URI section of the SOAP Web Service command, when you use a variable for the WSDL URI, you are prompted for a value when you connect. If a value is already assigned for the variable, you have an option to change that value.

Enterprise client changed features	
Feature	Description
Support for Adobe Flex version 32	Starting with 11.3.2, Automation Anywhere Enterprise client supports Flex plug-in version 32.
Download attachments in Email Automation Command	In the Email Automation command with Get All Messages option, you can now download attachments where the filename is in Korean.
Autologin for non-English OS (Zendesk #145010, 156665, 159152)	Autologin to the Enterprise client now works, even when the operating system is not in English.
Zip Files command compresses file(s) within a folder (Zendesk #133434)	<ul style="list-style-type: none"> <li>If you are upgrading from any of the previous 11.x releases to Version 11.3.2, note that the Zip Files command now compresses files directly without including the specified folder in the Zip file contents, even if you include a backslash at the end of the folder path in the Specify Files to Compress field and specify the File Type.</li> <li>The behavior of the Zip Files command with a non-empty File Type (filter) value matches the behavior of the Zip Files command with an empty File Type (filter) value. See <a href="#">File and Folder command</a>.</li> </ul>
Advanced Technology option for ANSI and VT100 terminal	<p>You can now use the Advanced Technology option for ANSI and VT100.</p> <p>Following are the changed behavior options for the ANSI and VT100 terminal when used with the Advanced Technology option:</p> <ul style="list-style-type: none"> <li>The KEY_HOME option places the cursor immediately after the Terminal prompt.</li> <li>The KEY_BACKTAB option does Shift + Tab.</li> <li>The KEY_PGRIGHT option does Page Up.</li> <li>The KEY_PGLEFT option does Page Down.</li> </ul>

Bot Insight changed features	
Feature	Description
Security	Passwords for development and production accounts under Zoomdata are now randomly generated and stored in the Bot Insight database instead of the property files. This provides an extra layer of security to access the dashboards from Zoomdata directly.

## Fixed features

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
180036	For the RDP deployments, the Bot Runner session entry is now logged correctly in the Audit Log of the Enterprise Control Room when the bots are scheduled to be deployed on different machines simultaneously.
168965, 175818, 192188	BLM: Importing tasks with permission restricted only at My Tasks folder but then permitted to a sub folder does not cascade to the folder imported bots and sub folders.
137652, 145368, 150676, 153746, 154429	You can now use the "&" (ampersand) symbol to set the password string for SQL Authentication. You can now also hover your mouse over the password and username fields to see the tooltip showing the permitted characters for the password string throughout the installation.
153088, 153633	The Enterprise Control Room now ensures that the RDP session runs uninterrupted, even in low network connectivity scenarios.
132546	A user deletion request does not fail when using the User Management API from Swagger because of an additional single quote (') that was appended to the Enterprise Control Room URL.
--	A Control Room user who deploys or schedules a task does not receive a task failure notification when the option A TaskBot stops running because it is unsuccessful, to the user who started or scheduled it is not selected by the Control Room administrator from the Administration Settings Email Settings page.

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
173083	The package files that are created after using Export in <a href="#">Bot Lifecycle Management</a> are deleted automatically from the Enterprise Control Room server repository after a specific time period.
144661	You no longer see errors about corruption of exported packages and can now successfully import bots using the Bot Lifecycle Management (BLM).
136103	Users with specific roles no longer have issues when opening the Repository Manager in the Enterprise Control Room, and they are now able to download files from an Automation Anywhere Enterprise client for the My Docs folder.
124197, 126944	The Admin user can now verify the changed Email ID using the verification link and can log in to the Enterprise Control Room successfully.
130130, 143626, 156570	You can now change the license from Bot Runner to Bot Creator successfully without any error.
132437	You can now successfully import a package with many bots without any error.
117268, 119048, 130838, 133760, 133906, 136035, 156272	Because the installation package no longer creates a double extension file in the temp folder, you can now install the Enterprise Control Room successfully with the anti-virus software installed on the system.
157390	When importing the bots using a package in the Bots Life Management, the system no longer shows an error and successfully imports the package.
105418	When scheduling a bot without specifying an end date, the View Activity now shows a blank entry instead of an irrelevant entry.
--	<p>The Workload Management feature is now able to successfully process all the work items in the device pool.</p> <p>If the device pool contains more than two devices and if one work item fails to process in</p>

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
--	one device, then it no longer affects the work items of other devices in the pool.
--	After installing Enterprise Control Room and configuring it for the first time, the system now generates the Credential Vault Key successfully by allowing you to save the Master Key in Express and Manual modes.
94985	When the system communicates with the Active Directory server using the LDAP protocol, the system now prevents unauthorized access by authenticating the input properly on the server side.
--	When exporting schedules in Schedule Management, the list now shows the recurring type as "one time" when scheduled once.
--	When creating a user in User Management, the domain name for usernames now permits the "-" (hyphen) and multiple subdomains using APIs.
--	Upgrading to Enterprise Control Room Version 11.3.2 from Version 11.3.1, Version 11.3.1.1, or Version 11.3.1.2 is now supported with an existing SQL Server database for your dashboard metadata repository.
157137, 161041, 164817, 178744	If you have Import permissions but not upload TaskBots permissions, you see the following correct error message when importing a package from the Enterprise Control Room:  Unable to import the bots. No uploaded permission.
--	An Enterprise Control Room user with appropriate permissions can delete users after the schedules associated with those users are deactivated from the Activity page.
--	During Enterprise Control Room installation, the Bot Insight Database Name in the Installation Summary is not updated with the user-provided information.

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
--	In the Activity page, the recurrence type shown is incorrect for the upcoming schedules.
--	When the option Repeats every is enabled in the Schedule + Devices tab, the Next occurrence value appears incorrectly on the Activity Scheduled page.
--	In Workload Management, when a queue is assigned for priority after processing some work items, it stops and then starts processing the remaining work items.
--	Bot deployment for Workload Management takes an extra minute to deploy from the trigger time set for a batch job.
--	A user must manually place the wlm.properties file to update the wlm.automation.trigger.interval time in the C:\Program Files\Automation Anywhere\Enterprise\config folder instead of automatically installing when running the Enterprise Control Room setup.
--	Now the system shows an appropriate message when a user with no upload permissions tries to import bots.
130115	The Install Summary of Automation Anywhere Enterprise Control Room Version 11.3.1 now shows the correct host name under the AAE Database Details section instead of "local".
124069, 145898, 165193	The user account that is used to run Automation Anywhere Enterprise services is automatically assigned "Log On As A Service" permissions under the local security policy during installation.
145320, 150524, 153729	After upgrading the Enterprise Control Room in a cluster setup to Version 11.3.2, the nodes sync up automatically when a network disruption occurs without restarting the AAE services.
179081, 185313	Some of the widgets in the Enterprise Control Room dashboards that did not show any data and showed the error: <b>An error occurred while reading data. Failed to prepare data read request. ORA-00907: missing right parenthesis</b>

Enterprise Control Room fixed features	
Zendesk Ticket ID	Description
110730	A configuration option is provided if there is a delay in bot deployment when the bot is located in a shared repository. The configuration option is to set the value of the notify.users.method.choice property in the ... \Automation Anywhere\Enterprise\config \deployment.properties file to 2.

Enterprise client fixed features	
Zendesk Ticket ID	Description
153287, 165000, 170408	<a href="#">TaskBots</a> executed using triggers run successfully after enabling the task queue option in the Automation Anywhere Settings file.
--	Duplicate and invalid audit entries for task failures with an Unknown status are not created in the Audit Trail of Enterprise Control Room when the task contains the System Restart command.
158691, 171451	When running <a href="#">MetaBot</a> Logic configured for an Oracle form, you can now continue to run the bot by adding the [TAB]/[Enter] keystrokes in the previous logic line without having to manually terminate the bot and wait for the application to respond.
137566	It is now possible to play <a href="#">MetaBot</a> Logic that is created for an Oracle form application embedded in Microsoft Internet Explorer in the Object/Applet Tag.
82209, 108373, 109466, 143338, 152074, 162849, 170100	In the PDF Integration, the Extract Text command now extracts the content from a PDF file in a structured format with minimum data loss. Note: See the Client Known limitations section.
	The Enterprise client now validates the server certificate not only during login to Enterprise Control Room but also during all client requests to the Enterprise Control Room.

Enterprise client fixed features	
Zendesk Ticket ID	Description
147850	The Start XML Session option in the XML Integration command no longer shows an error with XML documents. You can now start an XML session with the XML documents that include the DTD.
47608, 79846, 84453, 87003, 94296, 110499, 112470, 112665, 127302, 130909, 142118, 149680, 154018, 155913, 158753, 159341, 160083, 164127	The AAProxyServer.exe now no longer holds the CPU usage to the high value, once the task execution completes, the CPU usage decreases
--	The web application now opens with the correct table format with all the information available that allows you to do actions in the pop-up windows (child windows).
103935	When deploying a bot using the Auto Login feature in the Horizon VDI, the player no longer logs off and instead disconnects when the task completes.
126295, 162622	The Workload command UI with the Japanese OS is now fixed. You are now able to successfully add and save the Workload command.
158505	When a low-priority task is running repeatedly, and in-between, a high-priority task takes over, after its completion, the time to repeat for the low-priority task now resumes from when it was paused instead of from the beginning.
106840	The Get All Message command in the Email Automation now successfully fetches all the emails with the attachments.
131235	You can now view the Raw Data Parameters in the SOAP Web Service command after migrating a bot from 10.5.
131522	You can now run a TaskBot in administrator mode from the Enterprise Control Room.
132900	In the Loop While command with the Object Properties option, after editing the Loop Condition, you can now save the changes in the Loop While Object Properties window.
78260	The Object Cloning command now captures the window title of the Flex application and its contents correctly, even if the title varies (case-sensitive) from the browser window.

Enterprise client fixed features	
Zendesk Ticket ID	Description
125449	When you edit a MetaBot DLL logic, the function window title in the DLL pop-up now shows the corresponding function name.
118306	You can now install a Google Chrome plug-in using any of the four methods and the "CRX_VERSION_NUMBER_INVALID" error does not appear.
101757	The OCR command with the Capture Image By Path option using the TOCR engine now does not show an error that the file is used by another process. The image is captured and appears as expected.
94136	The Find Broken Links option of the Web Recorder command works as expected for all websites and does not show the 'Execution Error'.
81503, 119097	An automated task using a keystroke command to read values from a Microsoft Excel spreadsheet and write into a Microsoft Windows application using variables now works as expected.
175925, 188292	In Terminal Emulator command > Advanced Technology, the function keys KEY_PGUP and KEY_PGDOWN for TN3270 and TN5250 terminal types now do not error out after skipping the line of code.

Bot Insight fixed features	
Zendesk Ticket ID	Description
208587, 213338	<p>The password field is no longer encrypted and saved in the file scheduler.properties.</p> <p>Passwords are processed as plain text, so that you do not face authentication issues while creating tables in the scheduler database.</p>
132975, 136412, 136417	The dashboards now render correctly when you restart the Bot Insight and Enterprise Control Room services, and refresh Enterprise Control Room after a fresh installation of Enterprise Control Room.

Bot Insight fixed features	
Zendesk Ticket ID	Description
--	Numeric precision up to two decimal points is now fixed.

## Security fixes

Enterprise Control Room security fixes	
Zendesk Ticket ID	Description
95091	<p>Enterprise Control Room uses PostgreSQL for database management. The database runs locally on the same server as the web application. To connect to PostgreSQL through Spring, use a high-permissions account.</p> <p>Resolution: Provide Spring with an account created specifically for PostgreSQL with appropriate permissions.</p>
94985	<p>The Enterprise Control Room communicates with an Active Directory (AD) server by sending dynamic queries using the Lightweight Directory Access Protocol (LDAP). Specific dynamic queries might use weak string concatenation techniques.</p> <p>Resolution: Validate input on the server side instead of the client side by implementing a stringent input checking mechanism that does the following validation:</p> <ul style="list-style-type: none"> <li>• Type of data (number, string, and so on.).</li> <li>• Size of input (a range of numbers, the string length, and so on.).</li> <li>• Validity of characters (0 through 9, A through Z, a through z, and so on). <ul style="list-style-type: none"> <li>• This test must clearly define valid and illegal characters using a white-list and regular expressions.</li> <li>• Special characters, specifically * (asterisk) must be blocked.</li> </ul> </li> </ul>

Enterprise Control Room security fixes	
Zendesk Ticket ID	Description
48249, 49478, 52363, 62880, 65358, 84852, 100452, 138760, 138779, 141926	<p>The Credential Vault variables can be printed on any un-masked field. Therefore, the value can be printed in any plain text application.</p> <p>Resolution: An option is provided in the Credential Vault to use the credential only on password or masked-type fields in the Enterprise client.</p>
157041	<p>The forgot password questions shown when you are logging in to Enterprise Control Room do not have brute-force protection.</p> <p>Resolution: You now must complete a CAPTCHA text to log in to an Enterprise Control Room instance after three incorrect attempts at answering the security questions.</p>
132247, 145180, 146118	<p>Enterprise Control Room now enables direct integration with Security Information and Event Management (SIEM) tools to monitor the application for security purposes. You can configure Enterprise Control Room to forward all Audit Log entries to the SIEM dashboard.</p>
--	<p>The Ignite nodes can join the Ignite cluster without authentication. As a result, a malicious program written as an Ignite client or server can connect to the cluster and download all data stored in the cache.</p> <p>Resolution: Authentication requirements are introduced for Ignite nodes to connect to the cluster.</p>

Enterprise client security fixes	
Zendesk Ticket ID	Description and Fix
--	<p>When the task is running, the user session information is available as plain text from the AAClientService.log.</p> <p>Resolution: The token value is trimmed and only the last eight characters are shown.</p>

Enterprise client security fixes	
Zendesk Ticket ID	Description and Fix
--	<p>When a bot using the Email Automation command is running, if the player debugs logs are enabled, the email-related information is available as plain text in the debug logs.</p> <p>Resolution: Email-related information is now not logged in debug logs.</p>

## Deprecated features

No deprecated features are introduced in this version.

## Known limitations

### Enterprise Control Room known limitations

- When you upgrade to Enterprise Control Room Version 11.3.2, refresh the page to view the following options:
  - The language selection icon at the top right of the Enterprise Control Room page
  - The database type in the Database and Software tab, accessible from the Administration > Settings page of the Enterprise Control Room
- When you customize the default duration for the Authentication API key in the Configuration Settings page, the updates are shown in Minutes and not Days format in the Audit logs page.
- The Unknown entries in the Activity > History page are shown sorted first instead of last in an Enterprise Control Room configured to use an Oracle server for a database.
- If you connect with an older version of Enterprise client to the current version of Enterprise Control Room, the following issues are observed:
  - Tasks with status Pause for input in the Activity > In progress page cannot be aborted.
  - In the Audit logs page, multiple entries for disconnect and reconnect are logged.
- When you delete all the folders in the SVN repository that is configured for version control in the Enterprise Control Room, and configure the same repository again, then the earlier versions are also shown. To avoid seeing these earlier versions, delete the entire repository from the SVN server and create a new repository.

### Enterprise client known limitations

- Automation is observed to be inconsistent when the Automation Anywhere plug-ins are enabled for Chrome browser if two different versions of the Automation Anywhere Enterprise client are installed on one machine – for example Automation Anywhere Enterprise client Version 10.5.105 and Automation Anywhere Enterprise client Version 11.3.
- When extracting content from a PDF file using the Extract Text command in the PDF Integration, the extracted content can contain spaces.
- The VT100 Terminal set text command might not function as required using keystrokes, but if the Debugging mode is enabled, the tasks work properly.

- Password fields captured from specific applications might not be detected as secure in the Object Cloning, MetaBot screen, and Import Dataset commands. The secure Credential Vault (password-type) attributes are not supported for these input fields.
  - The App Integration command might not capture text on applications running on a 64-bit operating system.
  - In the Email Automation command (IMAP, POP3), an email message containing images as a part of the email body, is shown in raw format (encoded) instead of plain text or HTML.
  - The variable value defined in the Enterprise Control Room Deployment API is passed to a [TaskBot](#) only when the Windows credentials of the current logged in user on a machine or terminal server are the same as the login credentials set from the Enterprise client Tools > Options > Login Settings.
- Note: This limitation is for the machines that allow multiple users to log in simultaneously.

#### Bot Insight known limitations

CoE dashboards are not displayed when an Oracle database is used for Enterprise Control Room and PostgreSQL is used for Bot Insight metadata.

To show the CoE dashboards:

1. Open the DWMP\_LOG.properties file available at the DWAServicelbinsrcmainresources location, in the Enterprise Control Room folder on your machine.
2. Remove the following text:

```
getRunUUID=select runid from db.schema.task_run tr inner join db.schema.job_execution_users_devices je on tr.taskname+'.atmx'=je.name and dateadd(S, tr.starttimemillis / 1000, '1970-01-01')=:startTime and UPPER(je.fully_qualified_HostName) like UPPER(tr.machinename)+'%' where environmentname='Production' and taskid=:taskId
```

3. Add the following text:

```
getRunUUID=select runid from bi_ads.task_run tr inner join bi_ads.jobexecution_users_devices je on tr.taskname || '.atmx'=je.name and to_timestamp('1970-01-01', 'YYYY-MM-DD') + numTODSInterval(tr.starttimemillis / 1000, 'second')=to_timestamp( substr(:startTime, 1, 19), 'YYYY-MM-DD HH24:MI:SS') and UPPER(je.fully_qualified_HostName) like UPPER(tr.machinename) || '%' where environmentname='Production' and taskid=:taskId
```

4. Save the file and restart the Bot Insight services.

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.1.4 Release Notes

These release notes contain new features and fixed features introduced in Version 11.3.1.4 for Automation Anywhere Enterprise Control Room and Enterprise client. The Enterprise Control Room Version 11.3.1.4 has two different installers depending on your base version. See [Upgrade Considerations](#).

### New features

There are no new features introduced for Enterprise Control Room in this version.

There are no new features introduced for Bot Insight in this version.

Enterprise client new features	
Zendesk ticket ID	Description
Install Enterprise client plug-ins without internet access. (Zendesk # 109845, 159099)	Introduced the installation of the Enterprise client plug-ins, namely Adobe Flex, Microsoft Silverlight, and Google Chrome in offline mode. If you do not have internet access, you can use the command window to install the plug-ins. See <a href="#">Install plug-ins in offline mode</a>

### Changed features

There are no changed features in this version.

### Fixed features

There are no fixed features for Bot Insight in this version.

Enterprise Control Room fixed features	
Zendesk ticket ID	Description
204214	You can now change the license from Bot Runner to Bot Creator without any error.

Enterprise client fixed features	
Zendesk ticket ID	Description
206634	You can properly run the task in the Database command using the Stored Procedure option without any error, even when the Stored Procedure is binding within the package.
205867, 206786, 208603, 211885	In the Variable Operation command, when doing a mathematical operation using the System Variables (for example: \$Date\$, \$Day\$),

Enterprise client fixed features	
Zendesk ticket ID	Description
	you now get the same result with or without a space.
204346, 210479	In the Oracle application, the Select Item by Text and Select item by Index actions are now supported with the single line command and multiline commands individually and in combination with the LeftClick action.
205904	The MetaBot focus is not lost when task execution completes. You can now configure a property to enable or disable the setfocus API.
195585, 172792, 166886, 131235	You can now view the Raw Data parameters in the SOAP Web Service command after migrating the tasks from Version 10.5.
206077	The tasks created in Version 10.5 using the Object Cloning command properly capture and retrieve the details of the Silverlight object when they are migrated to Version 11.3.1.

## Security fixes

There are no security fixes listed for this version.

## Deprecated features

There are no deprecated features listed for this version.

## Known limitations

There are no new known limitations listed for Bot Insight in this version.

### Enterprise Control Room known limitations

If you have base Version 11.3.1 installed and you install Version 11.3.1.1 and then Version 11.3.1.4, the Control Panel > View Installed Updates shows two entries - one for 11.3.1.1 and another for 11.3.1.4. When you uninstall the patch, ensure that you uninstall the 11.3.1.4 (base 11.3.1) patch first and then the 11.3.1.1 patch.

### Enterprise client known limitations

- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

## Related reference

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[Upgrade considerations](#)  
[Version compatibility matrix](#)  
[Feature comparison matrix](#)

## Version 11.3.1.3 Release Notes

These release notes contain changed features and fixed features introduced in Version 11.3.1.3 for Automation Anywhere Enterprise client. Only Enterprise client patch installer is available in this release. See the notes section in the [Version compatibility matrix](#).

### New features

No new features are introduced in this version

### Changed features

Changes introduced in this release correspond to the Zendesk tickets listed in the table.

Enterprise client changed features	
Zendesk ticket ID	Description
169613, 184902	<p>To retain the legacy behavior of the Contains Header and Excel Cell Row options of the Excel command when used in a loop, a new configuration is introduced in the AASettings.xml file of Automation Anywhere Enterprise client, as follows:</p> <pre>&lt;retainexcelcellrowlegacybehavior&gt;</pre> <p>See <a href="#">Update Enterprise client settings file for Excel command</a>.</p>

### Fixed features

Fixes introduced in this release correspond to the Zendesk tickets listed in the table.

Enterprise client fixed features	
Zendesk ticket ID	Description
187571	In the Excel command, the values in an Excel cell row variable now increment and are used to set values during iteration in the Each row in Excel Dataset loop. Also, when Contains Header is selected, the Excel operation is not

Enterprise client fixed features	
Zendesk ticket ID	Description
	done on the first row of the cells that contain the header values.

## Security fixes

No security fixes are introduced in this version.

## Deprecated features

No deprecated features are introduced in this version.

## Known limitations

Enterprise client known limitations

- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.1.2 Release Notes

These release notes describe new features, changed features, fixed features, security fixes, deprecated features, and known limitations introduced in Version 11.3.1.2 of Automation Anywhere components Enterprise Control Room, Enterprise client, and Bot Insight. This release requires a complete setup.

## New features

Enterprise Control Room new features	
Feature	Description
Provision to change new <a href="#">Workload Management</a> interval in workload properties file	Introduced a sample code that enables a user to customize the time interval for processing new <a href="#">Workload Management</a> automation. Save the code as a properties file - wlm.properties in the application path config folder of the Automation Anywhere Enterprise Control Room. See <a href="#">Sample Workload Management properties file</a> for details.

Enterprise client new features	
Feature	Description
Error Handling command support to update Work Item status	In Work Load Management, Work Item status can be set using Error Handling command as follows: If the bot execution status is set as failed, the work item status is set to "unsuccessful" and "completed" when the bot execution status is set as completed. See <a href="#">Manage Work Items</a> for more information.

Bot Insight new features	
Feature	Description
Localization support for additional languages.	Bot Insight UI labels are in four new languages: <ul style="list-style-type: none"><li>• French</li><li>• Japanese</li><li>• Korean</li><li>• Spanish</li></ul>

## Changed features

There are no changed features listed for Enterprise client in this version.

There are no changed features listed for Enterprise Control Room in this version.

There are no changed features listed for Bot Insight in this version.

## Fixed features

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
133764	Enterprise Control Room Workload Management deployment was optimized. Redeployments no longer experience delays.
98237	RDP-based deployment no longer fails when Bot user credentials include the " " (pipe) character. Bot user credentials now support all the special characters.
85920,118115	A user with multiple domain names containing the "-" (hyphen) in an email address can now be created successfully.

Enterprise client fixed features	
Zendesk ticket numbers	Description
103817	The Download File command in Web Recorder now downloads the file successfully when the same bot runs across different machines with the installed Automation Anywhere Enterprise client.
147109	When a user tries to capture an object in the customer's JAVA-based web application using the Object Cloning command, the Get Property action now fetches all the properties values regardless of the defined Search Criteria.
145325	When the user runs the bot from the Enterprise Control Room, then AATaskExecutor (Execution_Type) no longer returns a NULL value and instead shows appropriate messages, for example, "Run from Control Room (Run bot)" when a bot is run manually and "Run from Control Room (One time Scheduled)" when a bot is scheduled.
141982	In the Variable Operation command, the Array variable no longer is rounded off and shows the exact value.
138818	In a JAVA-based application, the Get Cell Text by Index option in the Object Cloning command now highlights the object of the table.
130141	The Object Cloning command now works even if height, width, top, left, and other properties are set to null or white space. As a result, tasks built on any web application on version 10.5.8 run successfully when run on Automation Anywhere Client 11.3.1.
136153, 140162, 141583, 144898, 150729	The Counter variable in the Excel Set Cell command now works properly. If header is enabled, then the counter variable starts updating from Excel row 2. Otherwise, the counter starts updating from Excel row 1.
132863	The Get Node option in the XML Integration command no longer throws an error when using multiple nodes in an XML file that also uses comments.
132336, 133453	The REST Web Service command now gives the correct response "200:OK." The request now also contains the entity body and Content-Type header.

Enterprise client fixed features	
Zendesk ticket numbers	Description
113499, 119505, 120055	In the SAP BAPI Manager, the Import and Export Structures now get populated. As a result, the customer can now successfully automate the SAP-related process.
113277, 114176, 119804, 121538, 130699, 133689, 136759, 137225, 138822, 139840, 142566, 142922, 145265, 145687, 147031, 148016	Automation Anywhere Enterprise client service getting stopped because of memory leaks resulting from a bot deployment is now resolved.

Bot Insight fixed features	
Zendesk ticket numbers	Description
--	High CPU rates in Enterprise Control Room due to data refresh frequency is fixed. The default data refresh frequency was changed from real-time to hourly.
--	Full-screen dashboard button response is fixed. Expanded dashboards now open in a new browser. The button was moved to the right corner of the dashboard.
--	Returned value set for Date is fixed. When you run the date request, <code>v1/botinsight/data/api/getbotrundata/1/\$/{Date Value}</code> , it now returns the full set of 12 variables.
131051	Working dashboard data fails to load after upgrade from Automation Anywhere Version 11.3.x to Version 11.3.1 is fixed.
130838	Dashboard widgets fail at progressing screen with fresh installation of Version 11.3.1 is fixed.

## Security fixes

There are no security fixes listed for Enterprise Control Room in this version.

There are no security fixes listed for Enterprise client in this version.

Bot Insight security fixes	
Zendesk ticket numbers	Description
134812	The <code>httponly</code> flag for session cookies displayed in Bot Insight dashboards was changed from <code>Httponly</code> to <code>HttpOnly</code> to comply with RFC standards.

Bot Insight security fixes	
Zendesk ticket numbers	Description
103360	The two methods of XSS vulnerability with Bot Insight service deployment are fixed.
116824, 120973, 118240	Disable HTTP Options and HTTP Trace are fixed by changing the default on both from Enabled to Disabled.

## Deprecated features

There are no deprecated features listed for this version.

## Known limitations

### Enterprise Control Room known limitations

- The search function in Enterprise Control Room Audit Log page does not support ( ) (open and close brackets). If you search terms that contain these special characters, the Enterprise Control Room shows an error.

### Enterprise client known limitations

- When the \$ExcelCellRow\$ is assigned to \$PromptAssignment\$ or any local variable, it will be treated like a counter variable and hence when the variable is used in the Excel Set Cell command it will increment the counter if the Excel Header is included.
- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

### Bot Insight known limitations

- After upgrade from Automation Anywhere Version 11.3 to Version 11.3.1.2, audit dashboards fail to load workload widgets in workload dashboards.

#### Workaround:

1. Run the command prompt (cmd.exe) as Administrator.
  2. Browse to the Enterprise Control Room install directory. Default path is C:\Program Files\Automation Anywhere\Enterprise
  3. Execute bimigration.bat.
- Upgrading to Automation Anywhere Enterprise Version 11.3.1.2, from Version 11.3.1 or Version 11.3.1.1 with an existing SQL Server database for your dashboard metadata repository, is not supported.

For Bot Insight users upgrading to Version 11.3.1.2 who currently have their dashboard metadata repository in PostgreSQL Server, the metadata database migration from PostgreSQL Server to SQL Server is currently not supported.

Using SQL Server for the dashboard metadata database is supported on fresh installations with only new databases.

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Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.1.1 Release Notes

New features, changed features, fixed features, security fixes, deprecated features, and known limitations introduced in Version 11.3.1.1 of Automation Anywhere components Enterprise Control Room, Enterprise client, and Bot Insight.

### New features

There are no new features listed for Enterprise client in this version.

There are no new features listed for Bot Insight in this version.

Enterprise Control Room new features	
Feature	Description
IQ Bot compatibility	<p>Automation Anywhere Enterprise Control Room Version 11.3.1.1 is not compatible with Version 6.0.</p> <p>Automation Anywhere Enterprise Control Room Version 11.3.1.1 is compatible with IQ Bot Version 6.0.1.</p>

### Changed features

There are no changed features listed for this version.

### Fixed features

There are no fixed features listed for Bot Insight in this version.

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
130112, 140268	A Enterprise Control Room node setup in High Availability and Disaster Recovery (HA/DR) environment now launches successfully.
59526	The actions Run and Schedule are now working in Enterprise Control Room configured in a multi-domain environment.

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
128817	Inserting a work item using the Insert WorkItem API now returns an appropriate response and is also shown in the list of work items in a Queue.
126954,128309	Bot migration of bots in a Enterprise Control Room configured for SVN is successful.
121935	Enterprise client connection to a Enterprise Control Room configured for load balancing does not fail while the web page is loading on one of the nodes when the message "Server not coming up. So exiting!" was displayed.

Enterprise client fixed features	
Zendesk ticket numbers	Description
-	If the user enables Send email Notification on completion of task and also enables "Include Go Green message" check box from Tools > Options > Email Settings, then Go Green message will now be displayed in email notification when task is finished.
57954	The Watch variable window now displays all the array values as the counter updates through the rows.
104275	When the user upgrades the Client in Windows 10 from 10.x to 11.x, the Auto Login function scheduled from Enterprise Control Room now works successfully even under lock condition.
71957	In Insert Keystroke command, when the internal delay is configured using ALT GR DOWN/UP, then the value now saves correctly as inserted.
69699	The Insert Keystroke command now works properly on Internet Explorer using German keyboard. It does not skip the letters/alphabets after using ALT GR UP/DOWN combination.
88064, 95878	In PDF Integration command, users can now extract text and Form Field data from all pages of the PDF file.
103817	In Web Recorder, the Download file command now downloads the file properly without the Automation Anywhere player being hung.

Enterprise client fixed features	
Zendesk ticket numbers	Description
84520	In the Variable Operation command, the Task Editor now displays the correct variable values for the special characters.
104706	In Workbench, when the Object Cloning is carried out to obtain the property value of text like St. Peter, then it captures the entire string after " ." properly regardless of the capital/small letter of immediate word.
80552	An Excel file is not saved in the documents folder when opened in Read Only mode using the Open Spreadsheet and Close Spreadsheet options in Excel Command.
87849	Automation Anywhere Enterprise client displays an error and does not allow users to save a TaskBot that uses the same session name to open multiple excel files using Open Spreadsheet option of the Excel command.
128183	The value in a cell is shown incremental for an automation that uses Get All Cells option in Excel command in the loop Each row in an Excel dataset.
84464	Characters in languages such as Greek are shown in the terminal window after connecting to a terminal server using Advanced Technology option in the Terminal Emulator command.
50758	After upgrading from AAE 10.1 to any 11.3.x release, you can continue to extract text from custom form fields in PDFs by running tasks having MetaBot logic with DLL.
70166, 90064, 92469	In the Variable Operation command, negative numbers with comma as a thousands separator and dot as a decimal separator are displayed and assigned correctly.
105196	The SOAP Web Service command now supports nested XML requests in SOAP API calls.
112741	The Automation Player (AAPlayer.exe) works correctly while parsing messages sent from the Enterprise Control Room.
102777	The Extract Table option in a Web Recorder runs within a loop correctly even with a custom session name.

Enterprise client fixed features	
Zendesk ticket numbers	Description
125483	After upgrading from AAE 11.1.2 or 11.2.0 to 11.3.1, the HTML InnerText property of the Object Cloning command continues to capture the data from the list object as separate lines of text instead of one line of text separated by "\n".
59323	In the Variable Operation command, large numbers with exponential values assigned to variables do not get converted automatically to string format.
82209,109466	In the PDF Integration command the Extract Text option with Structured Text type now formats the extracted text as intended.

## Security fixes

There are no security fixes listed for Enterprise client in this version.

There are no security fixes listed for Bot Insight in this version.

Enterprise Control Room security fixes	
Zendesk ticket numbers	Description
125338	Users with Import Bots privileges are now unable to traverse the host system directories and extract arbitrary files on the system disk and attached network storage.

## Deprecated features

There are no deprecated features listed for this release.

## Known limitations

There are no new known limitations listed for Bot Insight in this version.

Enterprise Control Room known limitations

- If the Enterprise Control Room hot fix patch is installed in silent mode, then the machine on which it is being installed restarts automatically.
- Installation on Microsoft Azure was not certified for Version 11.3.1. It is certified for Version 11.3.1.1. The documented installation steps are correct.

Enterprise client known limitations

- When upgrading from Version 11.3 to Version 11.3.1.2, the Google Chrome plug-in is unavailable. To ensure that the Google Chrome plug-in enables properly, open Google Chrome from the Version 11.3 version before upgrading to 11.3.1.2.

Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3.1 Release Notes

New features, changed features, fixed features, security fixes, deprecated features, and known limitations introduced in Version 11.3.1 of Automation Anywhere components Enterprise Control Room, Enterprise client, and Bot Insight.

### New features

Enterprise Control Room new features	
Feature	Description
Support for Oracle as a Enterprise Control Room database (Zendesk #75665,100225)	<ul style="list-style-type: none"> <li>You can now choose to store the Enterprise Control Room database in Oracle.</li> <li>Enterprise Control Room 11.3.1 supports Oracle version 12.1.x.</li> <li>With the support for Oracle in this release, you can now select either SQL Server or Oracle to store the Enterprise Control Room database during the Custom installation.</li> <li>For Express installation, the Enterprise Control Room database will be created in SQL Server by default.</li> </ul>
Support for multiple Global Catalog (Zendesk #105259, 105535, 109590, 114510)	<ul style="list-style-type: none"> <li>Prior to 11.3.1, the Enterprise Control Room admin can configure Active Directory using the LDAP URL of a single Domain Controller (or Global Catalog) which at times can lead to single point of failure.</li> <li>The Active Directory configuration is now enhanced to support URLs of multiple Global Catalog per forest so that if one Global Catalog in a forest goes down the other can serve.</li> <li>With 11.3.1, the new capability ensures all Active Directory users have continued</li> </ul>

Enterprise Control Room new features	
Feature	Description
	<p>access to the Enterprise Control Room thereby maintaining business continuity.</p> <ul style="list-style-type: none"> <li>This feature does not provide support for load balanced URL of Active Directory in Enterprise Control Room.</li> </ul>
Support for traceability of System Restart, Shutdown or Log off during bot execution (Zendesk #81361, 87754)	<ul style="list-style-type: none"> <li>An audit entry is logged whenever a Bot Runner machine restarts or shutdown automatically or via System command in TaskBot, during the bot execution.</li> <li>When this event takes place, the ongoing automation is marked as completed and the status of bot run is set to successful in the Audit Log.</li> </ul>
Enhanced Audit Log entry for Import Bot packages (Zendesk #100193)	<ul style="list-style-type: none"> <li>The Audit Log now shows all the bots and files (including dependencies) that were skipped or overwritten during the import action in Bot Lifecycle Management (BLM).</li> <li>This feature helps to identify bots and files that were not imported in destination Enterprise Control Room.</li> </ul>

Enterprise client new features	
Feature	Description
Dynamic URI support in REST Web Service command (Zendesk # 54164, 62588, 63479, 64128, 67948, 68070, 71450, 73039, 74075, 75548, 81758, 83588, 83887, 84896, 88880, 93476, 93711, 97808, 100512, 103203, 104576, 104894, 107140)	<ul style="list-style-type: none"> <li>The REST Web Service command has been enhanced to provide user-defined variable within the URI of REST-based web service.</li> <li>Users can now easily move their bots running REST command from Test to Production by using dynamic hostname, port, or endpoints in URI.</li> </ul>
Support for downloading pre-configured bots from Bot Store	Enterprise client now provides a built-in interface to connect to Bot Store. Any user registered with Bot Store can now login to Bot Store from within Enterprise client and download the pre-configured bots from the Bot Store. This feature provides a seamless

Enterprise client new features	
Feature	Description
	experience to the Bot Creators making bot development faster and easy.
Support for option to overwrite attachment in Email Automation command (Zendesk #82257, 84110)	<ul style="list-style-type: none"> <li>The Email Automation – Get All Messages command has been enhanced by providing an option to overwrite files with same name in the folder where the email attachment needs to be saved.</li> <li>Unselecting this option allows the user to save the attachment with same name suffixed with a numeric value if an attachment with same name already exists in the selected folder.</li> </ul>
Encoding support for Error Handling in Log to File command (Zendesk #75406)	The Error Handling – Log to file command has been enhanced to allow user to select the encoding type – ANSI, UNICODE or UTF-8, for the log file. Prior to 11.3.1, only ANSI encoding type was supported.
Support for dynamic Port in FTP command (Zendesk #63377,92038)	The FTP command is enhanced to support user-defined variable in the Port field. Users can now automate connecting to FTP servers with different Port number.
Support for Uninstallation and reinstallation of Java Plugin (Zendesk #87947)	The uninstall and reinstall options are now available for the Java plugin both from the Client interface and from the command line. The uninstall and reinstall options allows the user to fix any issue with the plugin installation.
Support for 1024x768 screen resolution (Zendesk #36871,51741,60412)	<ul style="list-style-type: none"> <li>Automation Anywhere Client's Main interface and Task Editor are now responsive to 1024x768 screen resolution. On the Main interface, the Properties tab shows a scroll bar to easily navigate to the controls.</li> <li>Similarly, in the Task Editor, toolbar with action buttons are displayed as icons with a tooltip</li> </ul>

Bot Insight new features	
Feature	Description
Oracle support for Bot Insight database (Zendesk #75665,100225)	<ul style="list-style-type: none"> <li>The Bot Insight Database can now be stored in Oracle.</li> </ul>

Bot Insight new features	
Feature	Description
	<ul style="list-style-type: none"> <li>• Bot Insight 11.3.1 supports Oracle version 12.1.x</li> <li>• Earlier versions supported SQL Server however with the support for Oracle in this release, users can now select either SQL Server or Oracle to store their Bot Insight database during the Custom installation.</li> <li>• For Express installation, the Bot Insight database will be created in SQL Server by default.</li> </ul>
SQL Server support for Bot Insight metadata repository	<ul style="list-style-type: none"> <li>• The Bot Insight metadata repository can now be stored in SQL Server.</li> <li>• Earlier versions supported PostgreSQL. With the support for SQL Server in this release, users can now select either SQL Server or PostgreSQL to store their metadata repository during the Custom installation.</li> <li>• For Express installation, the Bot Insight metadata database will be created in SQL Server by default.</li> </ul>
Bad data deletion utility via API	<ul style="list-style-type: none"> <li>• This utility allows the user to search for data rows based on datatype mismatch via an API and mark them as bad data (soft delete).</li> <li>• The bad data rows cause Bot Insight dashboards to not load correctly and hence user can either search and mark those rows as bad or correct these rows so that there is no impact on the dashboards.</li> </ul>

## Changed features

There are no changed features listed for Bot Insight in this version.

Enterprise Control Room changed features	
Feature	Description
Default ports for Elastic Search and cluster nodes	In Version 11.3.1, the default HTTP port for Elastic Search is 47599 and the port to bind communication between cluster nodes is 47600.

Enterprise client changed features	
Feature	Description
Validate if attachment is missing in Send Email Command	<p>In the Send Email command, a new option 'Validate if attachment is missing' is now provided which when selected validates the missing attachment when sending an email, and displays an error if the attachment is missing.</p> <ul style="list-style-type: none"> <li>For customers upgrading from 10.x to 11.3.1, the bots having Send Email command will not require any change as the option 'Validate if attachment is missing' is not selected by default. This means that the Send Email command will run successfully even if the attachments are missing.</li> <li>For customers upgrading from 11.x to 11.3.1, the bots having Send Email command may need to be modified by selecting the option 'Validate if attachment is missing' for an error to be displayed for missing attachment(s).</li> </ul>
Download attachments in Email Automation Command	In the Email Automation command with Get All Messages option, you can now download attachments where the file name has special characters ("\\" or "/").

## Fixed features

There are no fixed features listed for Bot Insight in this version.

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
107047, 110175, 110928, 115663, 120749, 124691	When work items are added to the queue, the Enterprise Control Room pages are refreshed and work items in the queue are deployed as intended.

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
110175, 115664	When the user inserts several work items, and processes these work items, the status changes correctly from "Ready to Run" to "Active" and then to "Completed".
110030	Devices that have been previously added to a role and removed from the role can now be assigned to a device pool.
105256, 109182, 109470, 110962, 112391	After upgrading from Automation Anywhere 11.1.2 to 11.3 the user can authenticate to Enterprise Control Room through AD in a multi-domain environment.
46516	The counter "Task Completed Successfully" in the Enterprise Control Room Dashboard now gets updated every time a task is executed successfully.
95080	Enterprise Control Room now uses a more strong and unpredictable secret key to sign JSON Web Tokens (JWT) used for user's session management.
108323	When installing Enterprise Control Room, the error message displayed on creating SQL database now does not show password used for SQL authentication.
108286, 108522, 109877, 115122, 116006, 117507	During Enterprise Control Room configuration, after changing the Elasticsearch config file to local, you can now login to the Enterprise Control Room.
110074, 110158, 110449, 110967, 112664, 112816, 114525, 116381, 116655, 116844, 116941, 117714, 122439, 123079, 124692	In the Bot Lifecycle Management (BLM) module of the Enterprise Control Room, the "Export bots" can now export TaskBots having sub-tasks that are used as dependency in multiple TaskBots including other sub-tasks without an error.
113463, 114239, 116628, 119728, 120251, 121512	You can now delete a Bot Runner User from the Enterprise Control Room, or deallocate the Bot Runner license from the User, if the User is not linked to any in-progress or scheduled automation, credential, locker, or device pool.
88274, 99678	For the user of a Enterprise Control Room configured with floating license, the Historical activity page now displays the device name of

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
	all the previously as well as the currently logged in devices correctly.
108158, 112033, 114910, 123499, 124929, 126412	The device list of a Enterprise Control Room configured with floating license now shows a user as connected. The user is also able to login from the Client after re-connecting to a Citrix VDI session.
109182	Domain names now do not disappear intermittently from the domain list of Enterprise Control Room login page that is configured for Active Directory users.
110544, 117458	A Enterprise Control Room user can import bots/files having multilevel dependencies using <a href="#">Bot Lifecycle Management</a> feature.
111856, 120007, 123045	Enterprise Control Room users now do not get an "internal server error" while importing bots that were exported in an earlier version of Enterprise Control Room in the <a href="#">Bot Lifecycle Management</a> page.

Enterprise client fixed features	
Zendesk ticket numbers	Description
99858, 105491, 113411	All AANotification.exe processes terminate after the corresponding task is completed or after 30 seconds.
83379	You can now map network (shared) drives any number of times on machines where Automation Anywhere Enterprise client is installed.
108215	After migrating from Automation Anywhere 10.x to 11.x, a task executing any stored procedures after executing a stored procedure with parameters, now runs successfully.
95757, 115593	In a TaskBot containing nested loops with SQL query, the dataset obtained from SQL query in each loop is now updated with respect to the current SQL query that is being executed.
65213	In the Workbench, you can now paste text into the Find Text... textbox, which was copied after you have copied and pasted an action.
60321	In the MetaBot Designer you can now add screens and open the MetaBot multiple times

Enterprise client fixed features	
Zendesk ticket numbers	Description
	in the ASSETS and LOGIC screens without encountering any errors.
81015, 55121	When a task having MetaBot DLL as a dependency is deployed from the Enterprise Control Room, the task now identifies the DLL dependency and executes successfully.
58034, 66063	Smart Recorder now does not record unwanted actions when opening a PDF attachment from an email repeatedly, and now saves the email attachment files in correct order as per the recorded sequence.
64264	The Object Cloning command now captures HTML controls correctly without offsetting the capture area from the original position.
65235	In the Read From CSV/Text command, if a column value contains arithmetic operator then while reading the column value in a variable enclosed in double quotes, now returns a correct value instead of performing an arithmetic operation.
65956	When Prompt Assignment variable is used in the String Operation command, changing the variable type from "array" to "value", now does not prompt for array values.
69031	In PDF Integration command, users can extract values from Form Fields from all pages of the PDF file even when the pages have been added dynamically.
75736, 79969, 87126	When a task is triggered, \${Trigger Value\$} variable now returns a file name or window title even if the file name or window title contains any special characters like a comma.
86515, 90464, 103430	In REST Web Service command the URI for Windows AD authentication now fetches the details correctly.
88874, 107512	The task file does not open from its physical location (Application Path) using "Edit" or "Open With" option, or from the command line.
90961	When the Run Script command runs a VB script, it no longer gives any additional

Enterprise client fixed features	
Zendesk ticket numbers	Description
	argument variable if there is no argument in the command.
90314, 98490	When the user downloads all the files from the server Repository with VCS enabled, no error is displayed and all the files are downloaded as required.
109012	In Java application, when the Object Cloning :: Get cell by Index from table option is used, the cell is now highlighted on bot execution.
92012	In the Object Cloning command, the value of the HTML Name attribute is now displayed correctly in the Get Property option.
92008, 95084	In the XML command, when an user inserts or updates a new node as an empty node, the node produced is empty without a new line character.
109147	Users can now enable client side logs or make changes in Tools > Options without setting Auto Login credentials.
89173, 97794, 105228, 106440, 113332, 113788, 116098, 117485, 118883	Auto Login in Logoff mode now works on a machine where both Ctrl+Alt+Del and Legal Disclaimer are enabled.
93666	Users can now copy 100+ variables from one task to another with "Overwrite existing variables" option Yes and Yes to All.
112594	When a Task having MetaBot Logic with Password type variable as input parameter is created in 10.5.x and later migrated to 11.3.1, it can now run without the need of replacing the Password type variable with Credential Vault variable.
65089	In the Workbench, when a variable is created using "Convert to Variable" option, it is now displayed in the "Variable Manager" list.
89922, 95364	In Excel-Set Cell command, if the cell value is set using "Specific Cell", for instance: '\$Excel Cell(Scale,\$Excel Cell Row\$)\$', then the \$Excel Cell Row\$ now increments the cell row correctly when the next Set Cell command gets executed.
108158, 112033, 114910, 123499, 124929, 126412	A user is able to login from the Client after re-connecting to a Citrix VDI session.

Enterprise client fixed features	
Zendesk ticket numbers	Description
91433, 102113, 109448, 111872	In Email Automation command, all email attachments are saved when the option Get All Messages is selected.
97931, 102879	When creating a MetaBot Logic with dll, after selecting a credential variable as value, the user is now able to type or paste the value in the subsequent logic command.
104590	In REST Web Service command, the REST API call used to connect to CyberArk Vault now returns proper content in the Response body.
102615, 114760	In SOAP Web Service command, the Test Output now returns a proper XML response when testing some of the SOAP web services.

## Security fixes

There are no security fixes listed for Enterprise client in this version.

There are no security fixes listed for Bot Insight in this version.

Enterprise Control Room security fixes	
Zendesk ticket numbers	Description
109386	Fixed the vulnerability CVE-2015-6420 that was identified with commons-collections4-4.0.jar file in the installer.

## Deprecated features

There are no deprecated features in this version.

## Known limitations

### Enterprise Control Room known limitations

- If a user plans to install the Enterprise Control Room using Oracle database, the number of available connections in Oracle have to be increased using the SQL query:

```
alter system set processes=3000 scope=spfile;
```

Restart the server after running the above query.

- If the Enterprise Control Room is installed using Oracle database, then the "Repair" option in installer is currently non-functional.

- In the Enterprise Control Room Settings page, the Enterprise Control Room database section does not display the database parameter details when the Enterprise Control Room is installed with Oracle database.
- When upgrading from previous 11.x version to 11.3 or later, in the 'Change Active Directory Configuration' page if you enter an invalid URL, it will not be validated with LDAP server. If you correct it by providing a valid URL, the same error message might be displayed. To resolve this, refresh the page and reenter the correct URL(s).
- The support for Oracle to store Enterprise Control Room and Bot Insight database is applicable to fresh installation with new database only.
- Earlier Automation Anywhere 11.x versions cannot be upgraded to Automation Anywhere 11.3.1 with Oracle as the database.
- Migration from Automation Anywhere 10.x versions to 11.3.1 with Oracle database is NOT certified. It will be supported in a future release.
- The support for SQL Server to store Bot Insight metadata database is applicable to fresh installation with new database only.
- Earlier Automation Anywhere 11.x versions cannot be upgraded to Automation Anywhere 11.3.1 with SQL Server as the metadata repository for Bot Insight. This will be supported in an upcoming release.

#### Enterprise client known limitations

- For the Bot Store home page to be displayed in Enterprise client, JavaScript must be enabled in the Internet Explorer browser settings.
- If you minimize the Enterprise client window then the Profile menu in the Bot Store home page may not display all the menu options. The Enterprise client window must be restored to maximum so that the Profile menu displays all the menu options.

#### Bot Insight known limitations

- The support for SQL Server to store Bot Insight metadata database is applicable to fresh installation with new database only. For existing customers upgrading to Version 11.3.1, the metadata database migration from PostgreSQL Server to SQL Server is currently not supported.
- Version 11.3.1 Bot Insight dashboards do not display in Version 11.3.1 deployments that use both SSL and an Oracle database. For full support of Bot Insight dashboards with an Oracle database, do not use SSL or set Bot Insight to secure mode, in a Version 11.3.1 deployment.

#### Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

## Version 11.3 Release Notes

New features, changed features, fixed features, security fixes, deprecated features, and known limitations introduced in Version 11.3 of Automation Anywhere components Enterprise Control Room, Enterprise client, and Bot Insight.

## New features

Enterprise Control Room new features	
Feature	Description
Support for Japanese RPA (Zendesk #89692, 76395)	<p>Version 11.3 has been tested and certified to work on Japanese Operating Systems, Language, Locale, and Regional Settings. With 11.3, the RPA users can:</p> <ul style="list-style-type: none"> <li>• Install Automation Anywhere Enterprise Control Room and Client on a machine with the Japanese Operating System, Language, Locale, and Regional Settings.</li> <li>• Automate applications (Web and Desktop) with Japanese UI, text, and controls values (e.g. push-button with a Japanese name, combo-box items in Japanese text etc.)</li> <li>• Provide Japanese name to a bot, Workflow and Report in Enterprise client.</li> <li>• Provide Japanese name to Bot Schedules, Automation Name and Description, Role Name and Description, User's First and Last Names, Workload Pools, and Queues.</li> <li>• Deploy a bot with a Japanese name onto Bot Runners.</li> </ul> <p>View the Japanese entities (names, description etc.) across all the pages in Enterprise Control Room.</p>
Enhanced Scheduler APIs	AAE 11.3 provides even more APIs for Schedule Management. With these APIs, Customers can create their own custom dashboard to create and manage Schedules. The dashboard can be localized and customized as per the Customer's choice (language, display of fields etc.). This removes the dependency on the Enterprise Control Room and enables access of RPA schedules across Third Party Applications and dashboards.
Support for Attended and Unattended Automation	With 11.3, there is a clear segregation of Attended and Unattended RPA within the product. Customers can configure X number of attended automation users and Y number of unattended automation users.

Enterprise Control Room new features	
Feature	Description
	<ul style="list-style-type: none"> <li>• <u>Attended Users:</u> This is a new category of Automation Anywhere users which is introduced in the product. Users who are tagged as attended automation users can run the bots only on their own workstations using the Enterprise client. These users can also make use of local schedules and triggers for time/event based automation. Main usecase for Attended Users would be Front Office Automation, where a bot may require user input. bots cannot be deployed from Enterprise Control Room to the machines of Attended Users.</li> <li>• <u>Unattended Users:</u> Unattended Users can perform all automation tasks that Attended Users can perform, such as manual run of bot. Additionally, Unattended Users can also be used for Enterprise Control Room deployment, centralized scheduling and API based deployment. Unattended automation would primarily be for bots that do not require user input and can also work on unmanned Machines/VMs/VDIs/Cloud Infrastructure.</li> </ul> <p>Note: A new license file is required to use this feature</p>
Multi-forest Support (Zendesk #47892,66487,101239)	<p>With 11.3, Automation Anywhere supports Active Directory multi-domain as well as multi-forest deployments. This ensures RPA Infrastructure can be spread across multiple Active Directory (AD) forests. For example, all Bot Creators and Bot Runners, across the AD forests in enterprise, can connect to a single Enterprise Control Room configured in any of the forests. This significantly reduces deployment and management of separate RPA instances across the AD forests. This also enables rapid RPA scaling without making too many changes to IT Infrastructure.</p> <p>Note: Two-way trust relationship should be configured for Active Directory forests.</p>

Enterprise Control Room new features	
Feature	Description
Chat-Bot Integration	<p>With the enhanced Work-Load APIs provided in AAE 11.3, a user can orchestrate an RPA system to link Chat-Bots to Automation Anywhere's TaskBots. Data can be sent from Chat-Bots so as to populate a Work-Load queue, which the TaskBots will process at regular customizable intervals; and the resulting output of the TaskBot can be sent over to the Chat-Bot for real-time consumption and display to the end-user.</p> <p>This ensures that the end-users (who are chatting) get a real-time view and progress over their servicing requirements; thus, enabling fastest SLA adherence</p>
Audit Log Time Filter	<p>Enterprise Control Room users can refine the Audit Log records using a pre-built time-based filter. Users can see the Audit Log records for a pre-set time duration example. last day/week/month/quarter. Users can also use a custom search criterion to find Audit Log records between any two given date and time ranges. Users can combine time filter with the table level filters available at the Audit Log page. For any given time-filter, count of records is also displayed.</p>
Elasticsearch Support	<p>11.3 Enterprise Control Room uses Elasticsearch to store and retrieve Audit Log data. This enables users to quickly search desired Audit Log records across all table columns, perform free text search, use wild cards, include and exclude search phrases etc. Elasticsearch fetches results very fast despite Audit Log containing millions of the records. User can also configure the back up of Elasticsearch data on the Disaster Recovery (DR) environment.</p> <p>Note: When you migrate from earlier versions of Automation Anywhere Enterprise (For example, 10 SP2, 11.2) to Version 11.3.x, the Audit Logs will be migrated to Elasticsearch</p>

Enterprise Control Room new features	
Feature	Description
Improved UX with Row level 'mouse-hover' actions	from SQL Database. The SQL Database will no longer be used to store Audit Logs.
	Users have more flexibility now, in their interaction with individual items of Enterprise Control Room tables. Users can now configure to keep the row level actions static or floating (display on mouse hover), in Enterprise Control Room tables. If the actions are kept static, users can further choose to have those actions displayed on the left-hand side or right-hand side of table

Enterprise client new features	
Feature	Description
Support for TLS 1.2 and SSL connection for Terminal Emulator (Zendesk #72468, 75968, 77578, 79052, 82382, 84628, 86684, 88362, 92034, 97962, 101094)	With Enterprise client Version 11.3, users can automate Mainframe terminals that operate only over SSL or TLS 1.2 Connection. 11.3 Terminal Emulator command also bring in Advanced Technology for terminal connection so as to support Japanese code-pages.
Chrome 'Record and play' support for multiple-users on Terminal Server (Zendesk #53067, 77888, 79720, 96238, 103135)	Multi-user 'Record and play' of applications over Chrome is now possible with Enterprise client Version 11.3. This enables the users connected with the same Terminal Server to record applications over their instance of Chrome concurrently. This also enables a user to deploy a 'Chrome Automation Anywhere' bot from the Enterprise Control Room over to Bot Runners sharing the same Terminal Server.
Enhanced extensibility using Abbyy OCR	Enterprise client now enables users to better configure image processing by Abbyy OCR engine. Abbyy uses same set of default parameters to extract images from screens of different applications. Different application images may need different parameters to deliver optimal OCR results. User is allowed to change default value of any of the parameters used and supported by Abbyy such as enable/disable table detection, configure resolution mode, etc. This enhancement is available at all the places where OCR support is available viz. OCR command, MetaBot custom objects, and AI-Sense.
Azure, Horizon VDI and Citrix XenApp Certification (Zendesk # 52223,54421)	Enterprise client Version 11.3 has been extensively tested on Azure Infrastructure,

Enterprise client new features	
Feature	Description
	VMWare Horizon VDIs and Citrix XenApp has been provided with Enterprise client Version 11.3.

Bot Insight new features	
Feature	Description
Center of Excellence (CoE) dashboard	CoE Dashboard is now available with customizable metadata columns and additional business information to provide real-time ROI information.
Elasticsearch Adhoc Analysis	Audit Trail dashboard enables easy search and is similar to a search engine like Google Search . Allows for easy adhoc analysis and drill-down using text search.
Timestamp Data Formats	Enhanced support for seven new timestamp formats in input data. With this release a smarter engine is available requiring less work at Bot Creator end to pre-format the information.
Look and Feel	Look and feel improvements have been made for the user interface to match the Automation Anywhere version 11 Enterprise Control Room interface.

## Changed features

There are no changed features listed for Enterprise Control Room in this version.

There are no changed features listed for Bot Insight in this version.

Enterprise client changed features	
Feature	Description
\$Excel Cell Row\$ variable always returns the row number of last affected cell in Excel Command	When using the \$Excel Cell Row\$ variable in Set Cell or Go to Cell options of Excel command in a loop, the \$Excel Cell Row\$ variable always returns the row number of last affected cell and does not increment at every iteration of the command. This behavior is independent whether "Contains Header" is checked or unchecked in the Open Spreadsheet option of the Excel command. Note: Existing customers if using \$Excel Cell Row\$ variable for incrementing the row may

Enterprise client changed features	
Feature	Description
	have to modify their bots by using a counter instead.

## Fixed features

There are no fixed features listed for Bot Insight in this version.

Enterprise Control Room fixed features	
Zendesk ticket numbers	Description
82601, 82615	Authentication API prompts error "Access Denied" in HTTPS Connection
96586, 97793, 101607	Task schedules disappear from Enterprise Control Room
99491	Upon Enterprise Control Room installation, the Licensing Service is starting by default in local system account and thereby impacts bot files (atmx files) migration
98940	Hibernate constraint error when migrating bots
98940	Even when 'Overwrite' option is selected for bot migration, it gives an error "A bot with the same name already exists"
98556	During migration, the duration shows 00:00:00 in certain scenarios
98279	In certain cases, the password is displayed in log files.
95079	The Enterprise Control Room divulges information, such as the server's type in an error page
94287	Enterprise Control Room does not show progress for queued tasks when the first task fails
90879	Even if PostgreSQL is installed on a separate server, the Enterprise Control Room repair installation installs PostGre Service on local server as well
93363	The Enterprise Control Room installer fails to connect with SQL with custom database port
81824, 91668, 93128	Passwords are stored in plain text post Enterprise Control Room Installation.

Enterprise client fixed features	
Zendesk ticket numbers	Description
95339, 99894, 100820, 101826, 102024, 103266, 103589	Intermittent errors while sending emails using the Send Mail Command.
93225	Unzip command generate a folder with garbled name in Japanese environment
89518	Microsoft Edge – Automation Anywhere plugin is disabled when Edge starts.
90009, 90014	Short-cut key shared between two features
83917, 86334, 98554, 102710, 82052, 83917, 96857	Terminal Emulator does not share session between the main and sub-tasks.
62053	Cannot initialize values in more than 100 rows in Array variable
95952	Terminal Emulator (TE) session now does not close when MetaBot-Run Logic is called. The TE session remains active until the Disconnect command is called.
104154	On enabling the organization's group policy, a system administrator is now able to run the Enterprise client setup successfully.

## Security fixes

There are no security fixes listed for this version.

## Deprecated features

There are no deprecated features listed for this version.

## Known limitations

### Enterprise Control Room known limitations

- Filtering on the fields Status and Type do not work for the Enterprise Control Room API that is used to fetch a list of devices. See [API for deploying and monitoring bot progress](#)
- A user can repair an existing instance of Enterprise Control Room only from Control Panel\Programs and Features\Install or change a program option. It cannot be repaired using the Repair option provided in the installer executable.
- Installer does not support installing a Certificate Authority Certificate (trust anchor) unless a secure database connection is selected. If you want to connect the Enterprise Control Room to other services securely via TLS, such as LDAPS and secure SMTP you must manually import your CA certificate into the Enterprise Control Room after the Windows installer but prior to completion of web-based configuration.

- When the Automation Anywhere Enterprise Control Room Caching services is restarted, the Automation Anywhere Enterprise Control Room Service should also be restarted.
- When Automation Anywhere Enterprise Control Room Services are restarted (Or) when Enterprise Control Room is installed for the first time, it will take time (~5 minutes) for the Enterprise Control Room UI to be shown in the browser.
- Packages exported via User Interface in Bot Lifecycle Management cannot be used by APIs (and vice versa).
- There could be instances of multiple audit entries (for create locker, create queue scenarios).
- It is critical that communication between the Enterprise Control Room servers is sufficiently protected as it contains security sensitive information that is not encrypted. All network hosts, apart from Enterprise Control Room servers, should be blocked from accessing the cluster communication ports listed in the Architecture and Implementation Guide .
- Filtering and Sorting is available on select few columns of Enterprise Control Room tables and not on all columns.
- The following time-zones are not supported when scheduling bots:
  - EST
  - GMT+0
  - GMT-0
  - HST
  - MST
  - ROC
- When installing Enterprise Control Room on Windows Server 2016 Datacenter Edition, it may give an error "The installation of Microsoft Visual C++ 2013 appears to have failed. Do you want to continue the installation?". Click Yes on this dialog to continue the Enterprise Control Room installation.
- The Enterprise Control Room dashboards may fail to load if 'Use Secure Connection' has been used on the PostGre SQL step (of Enterprise Control Room Installation) and the PostGre server is not configured for secure connection.
- If Enterprise Control Room is installed on multiple nodes, and if one or more nodes are down, it may give an error "Failed to connect to Elasticsearch server". The user has to wait for approximately 20-30 seconds to login into Enterprise Control Room.
- If Enterprise Control Rooms are installed on multiple nodes, and if cluster IPs are null, you may get duplicate audit entries "Elasticsearch backup cluster IPs are null".
- If there are million+ records in the audit trail, and if you have a filter; then it may take time to navigate to the last page.
- To search the exact phrase in audit trail, enclose that within double quotes e.g. "Mike-Finance-564"
- If Automation Anywhere is taking up a backup of Elasticsearch for Enterprise Control Rooms with cluster IP, the audit trial may display 'N/A' in Action type and View details.
- When configuring PostGre Database (while installing Enterprise Control Room), there should not be a space in the PostGre Database name
- If you were previously using 11.x and now upgrading to 11.3, you need to perform clear cache operation in your browser before going live with 11.3 Enterprise Control Room.
- It may take up to three minutes for an audit entry to reflect for failed deployment of a task.
- On the "In progress activity" page, the "Unknown" status may take some time to reflect while the associated device is disconnected and the Player is running.

#### Enterprise client known limitations

- While uninstalling Enterprise client, the user might come across a 'File in Use' page that displays process ID numbers instead of showing the open Automation Anywhere applications.
- In certain operating systems having stringent security policies, while uninstalling Automation Anywhere 11 LTS Client, the "Automation.CredentialProvider.dll" (in the System32 folder) does not get removed by the uninstaller. In such cases, the dll must be manually deleted or by using a batch script.

- If the Enterprise client Version 11.3 remains offline (disconnected from the Enterprise Control Room) for more than eight hours; the user must login again to the Enterprise client Version 11.3 to renew the user session. This is in line with Industry Standard policies on token expiry.
- Adobe Flex and Microsoft Silverlight are not supported in Windows 10 and MetaBots.
- Adobe Flex is not supported in Windows Server 2012 or Windows Server 2016.
- In certain scenarios, the Java plugin installation state may not be correctly reflected, even when Java plugin is installed.
- Autologin in logoff case for Windows Server 2016 is inconsistent. We recommend use of 'Run Bot Runner session on Enterprise Control Room' (RDP based deployment).
- Object cloning is not supported for Oracle Forms.
- Firefox browser is not supported in MetaBots.
- For MetaBots recording, to record any web application, the application must be opened in Internet Explorer 8 and above in document mode.
- Microsoft Edge automation is not supported in MetaBots.
- When 10.x and 11.x Enterprise clients are installed on the same machine, the 'Advanced Technology' option of Terminal Emulator will not work and its corresponding DLL will not be removed from the machine when Automation Anywhere is uninstalled.
- If you want to trigger a bot when Office files (for example, .docx, .xlsm, etc.) are modified, use the 'When file is renamed' option of trigger. This is an inherent behavior of Microsoft Office.
- The 'Advanced Technology' option of Terminal Emulator command will not support insecure Cipher Suites for SSL Connection, for example TLS\_RSA\_WITH\_DES\_CBC\_SHA (0x09).

Some of the more common SSL ciphers supported:

TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_CBC\_SHA (0xc00a)

TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_CBC\_SHA (0xc009)

TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA (0xc014) TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013) TLS\_RSA\_WITH\_AES\_256\_CBC\_SHA (0x0035) TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA (0x002f)  
TLS\_RSA\_WITH\_3DES\_EDE\_CBC\_SHA (0x000a)

#### Bot Insight known limitations

- After migration from Automation Anywhere 10 LTS to Automation Anywhere 11.3, dashboards that were marked as bookmarks do not show up in the bookmarks section of Bot Insight. Users will need to bookmark their favorite dashboards manually.
- Sometimes the KPI widget does not show data specifically in the Internet Explorer browser. To make this work, go to Internet options > Advanced tab and click Reset Internet Explorer settings.

#### Related reference

[Upgrade considerations](#)

[Version compatibility matrix](#)

[Feature comparison matrix](#)

# Automation Anywhere Enterprise architecture overview

This is the landing page for the collection of topics related to Automation Anywhere architecture.

## Overview

These collection of topics are primarily intended for IT Managers, Enterprise Architects, and Technical Decision Makers to assist in implementing RPA using Automation Anywhere.

- [Automation Anywhere Enterprise architecture](#)

Provides a high level overview of architecture and components, including Bot Creator, Bot Runner and Enterprise Control Room.

- [Capacity and performance planning](#)

To plan your deployment capacity and performance, understand the requirements, limits, and defaults that determine the number of simultaneous bots, user sessions, and processing rates.

- [Deployment requirements and planning](#)

Use these data center prerequisites, hardware and software requirements, pre-configuration, and planning specifications to prepare for Automation Anywhere deployment and use.

- [HA, DR, 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, Highly Available (HA) clusters at single locations, and Disaster Recovery (DR) across geographically separated sites.

- [Enterprise Control Room operations overview](#)

Provides overview of control room operations.

- [Bot design guidelines and standards](#)

Advanced guide to developing bots and providing guidelines and standards for bot development.

## Automation Anywhere Enterprise architecture

Provides a high level overview of architecture and components, including Bot Creator, Bot Runner and Enterprise Control Room.

This set of topics introduces the core Automation Anywhere components and the required data center configuration required to install and deploy the Automation Anywhere components.

This set of topics is primarily intended for IT Managers, Enterprise Architects, and Technical Decision Makers to assist in implementing RPA using Automation Anywhere.

- [Enterprise Control Room overview](#)

The Enterprise Control Room provides automated provisioning, orchestration, governance, and actionable analytics for Enterprise-wide implementation. This includes managing, scheduling, executing, and configuring capabilities of bots, Bot Runners, and Bot Insight using a collection of specialized web services.

- [Enterprise client overview](#)

Introduces Enterprise client components and operations.

- [Deployed components](#)

Describes the required and optional components used in Automation Anywhere data center installations.

Related concepts

[Deployed components](#)

Related reference

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

[Load balancer requirements](#)

[Bot Creator overview](#)

[Bot Runner overview](#)

[Enterprise Control Room overview](#)

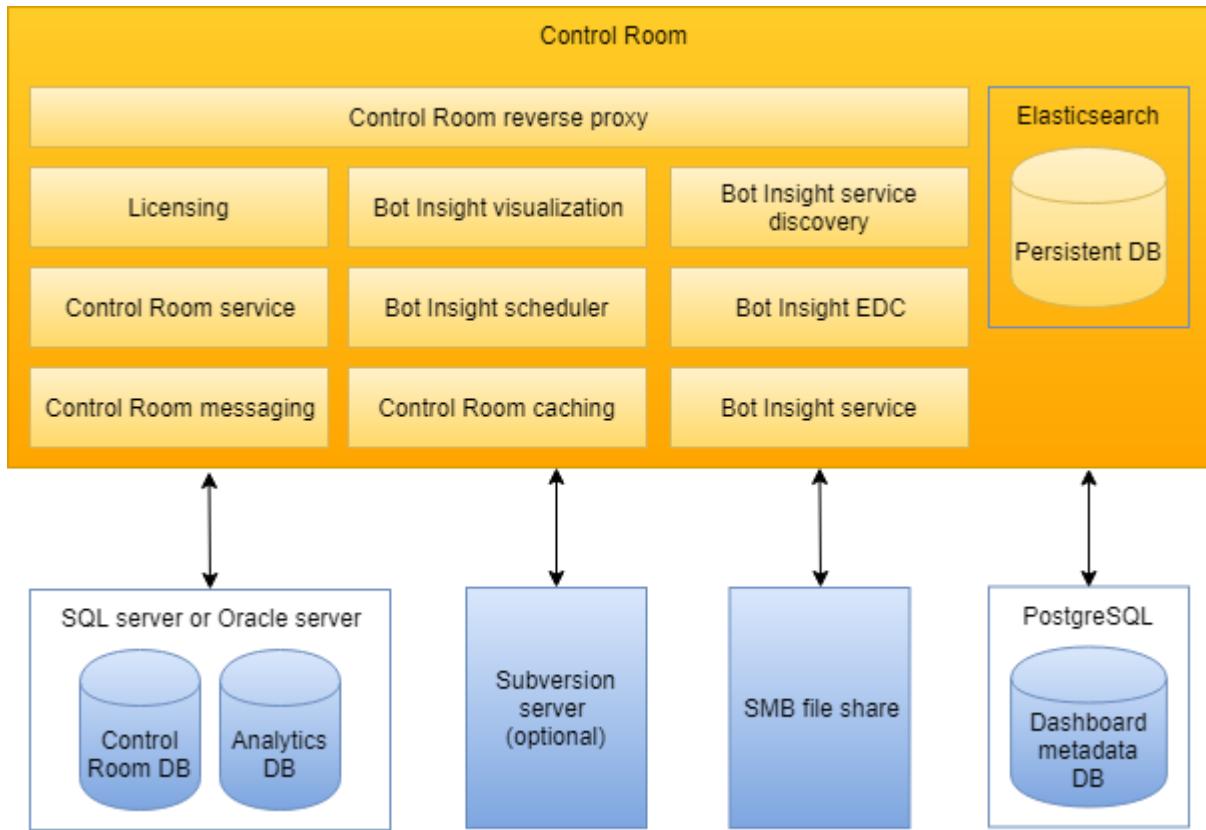
## Enterprise Control Room overview

The Enterprise Control Room provides automated provisioning, orchestration, governance, and actionable analytics for Enterprise-wide implementation. This includes managing, scheduling, executing, and configuring capabilities of bots, Bot Runners, and Bot Insight using a collection of specialized web services.

The Enterprise Control Room is a centralized management point for all bots. The Enterprise Control Room is the brain of the digital workforce platform. It is a Microsoft Windows server-based web application providing a single administrator interface for Enterprise-wide bot deployment, management, and control, including the Bot Insight analytics functions and Elasticsearch search functions.

In the data center, Enterprise Control Room is installed on a server and configured to interact with the other data center components. A reverse proxy is responsible for listening for remote connection requests and forwarding those requests to the correct specialized service. The data center can be on-premise server or provided through a cloud service provider. The following figure shows the Enterprise Control Room components and general data center interaction. Objects in orange are Automation Anywhere components. Objects in blue are data center components provided by your organization.

## 11.3.1



Enterprise Control Room functions include:

- Automation Anywhere licensing
- Enterprise Control Room services
- Enterprise Control Room messaging
- Enterprise Control Room caching

Bot Insight functions include:

- Bot Insight visualization
- Bot Insight scheduler
- Bot Insight service discovery
- Bot Insight Elastic Data Cloud (EDC)
- Bot Insight service

Elasticsearch integrated with Enterprise Control Room to provide full search capabilities.

Data center components that are not included with Automation Anywhere include:

- 11.3.1 A Microsoft SQL Server or Oracle Server database.

Automation Anywhere creates a Enterprise Control Room database and several Bot Insight analytics databases during installation.

- A Subversion server (optional)
- A Server Message Block (SMB) file share
- PostgreSQL Server

Optionally installed during Automation Anywhere installation. Automation Anywhere creates a dashboard metadata database.

## Centralized Automation Deployment

Central bot control.

Enterprise Control Room acts as the single point of access and control for bot execution:

- All bot across the enterprise are first uploaded to the Enterprise Control Room.
- All Bot Creator and Bot Runner are registered to a Enterprise Control Room before they are operable.
- Only the Enterprise Control Room can execute bots on Bot Runner.
- Only bots loaded in the Enterprise Control Room execute onBot Runner.

Bot authentication.

Every single automation activity is authenticated through the Enterprise Control Room.

Remote bots.

Control remotely running automation bots centrally from the Enterprise Control Room.

Version control.

Uploading and downloading bots to Enterprise Control Room:

- Applies built-in bot version control features
- Facilitates seamless collaboration for end to end business process automation
- Supports multiple users

Scheduling.

All scheduling is managed by through Enterprise Control Room. Bots are deployed on the Bot Runners either ad hoc or on pre-defined schedules. Once the schedules are created, Enterprise Control Room automatically and intelligently picks up the subsequent updates to bots, without any need to alter automation schedules.

## Centralized Access Control

Least Privilege and Access Controls.

To ensure a secure digital workforce platform, Enterprise Control Room implements user access using granular Role Based Access Control (RBAC).

Creating users.

All users and roles are created and managed from the Enterprise Control Room. See [Roles Overview](#), [User management overview](#), and [Default licenses and roles for bot tasks](#).

#### Custom roles.

Administrators define custom roles and set permissions for the full suite of Enterprise Control Room objects and functions. See [Create a Role](#).

#### Controlled Functions.

Applied licenses and roles manage: user management, licensing, Credential Vault, bot schedules, dashboards, and audit logs.

#### Authentication.

Leverage multiple authentication options of Active Directory using LDAP, Active Directory using Kerberos, local authentication using the embedded Credential Vault, and Single Sign-On (SSO) using Security Assertion Markup Language (SAML) 2.0.

#### Version control.

Access built-in bot version control feature for multi-user collaboration.

#### Credential management.

Store system-managed credentials and critical system configuration data using secure Credential Vaults.

#### Encryption.

Apply industrial grade encryption for data at rest and in transit.

## Centralized Workforce Management

#### Real time data.

Enterprise Control Room receives real time heartbeat and telemetry data from automations in the form of events, exceptions, and alerts.

#### Authorized users.

Only authorized users can pause, resume or stop any of the ongoing automations on any Bot Runner.

#### Business needs.

Meet the demands of dynamic Service Level Agreements (SLAs) using dynamic workload management (WLM) for industrial-scale automation. WLM includes built-in SLA calculators with a human-in-the-loop flexibility to enable prioritization of high-value task queues. Enforce best practices to meet stringent compliance mandates using Bot Lifecycle Management (BLM). See [Workload overview](#).

#### Dashboards.

Enterprise Control Room dashboards provide a single view of the entire automation infrastructure.

Customize automated dashboards. See [Dashboards overview](#).

#### Event details.

Capture event details for user and entity actions including the creating, modifying, enabling, disabling, and removing users, bots, Bot Creator, and Bot Runner.

#### Customize reports.

Monitor using reports to identify and alert you about abnormal activities.

#### Export logs.

Export logs to use them with other analysis, reporting, and incident investigation/response infrastructure already in use by the organization, for example, Security Information and Event Management (SIEM) and advanced analytics tools.

#### Audit logs.

All historical automation data is logged in and available through Enterprise Control Room audit logs.

See [Audit log overview](#).

## Enterprise client overview

Introduces Enterprise client components and operations.

The Enterprise client is a Automation Anywhere component that is:

The primary interface for:

#### Bot Creator

A bot is a self-contained task designed to run with little-to-no human intervention. The Bot Creator is the Automation Anywhere proprietary development client used to author bots. This includes Task Editor, event watcher, bot Player, Auto Login, and local scheduler. See [Bot Creator overview](#).

#### Bot Runner

The Bot Runner is the software machine that runs bots. When a bot is created using Bot Creator, then Bot Runners can run bots at scale. See [Bot Runner overview](#).

Installed on

The Enterprise client is installed on any user device. User devices can include virtual machines, servers, or other supported Windows machine.

A multi-threaded application

Enterprise client is a multi-threaded application, it performs multiple tasks in parallel including bot tasks, such as:

- Sending the Operational Analytics data to the [Control Room](#) .
- Maintaining the queue for other [bot](#) if there are multiple bots deployed on the same [Bot Runner](#).
- Monitoring the pause, resume and stop events for bot during the bot execution.
- Running multiple CPU intensive tasks such as Object Cloning, Image Recognition, OCR, PDF Integration, and Terminal Emulation. that are CPU intensive, as multiple threads or processes to avoid blocking the main thread.

Run in parallel with other Automation Anywhere Enterprise services

The following applications and services of Enterprise client also run in parallel:

- Automation Anywhere.exe
- Event Watcher.exe
- [AAESchedulerService](#)
- [AAClientService](#)
- [AAAAutoLoginService](#)
- Proxy Server

#### [Bot Creator overview](#)

A bot is a self-contained task designed to run with little-to-no human intervention. The Bot Creator is the Automation Anywhere proprietary development client used to author bots. This includes Task Editor, event watcher, bot Player, Auto Login, and local scheduler.

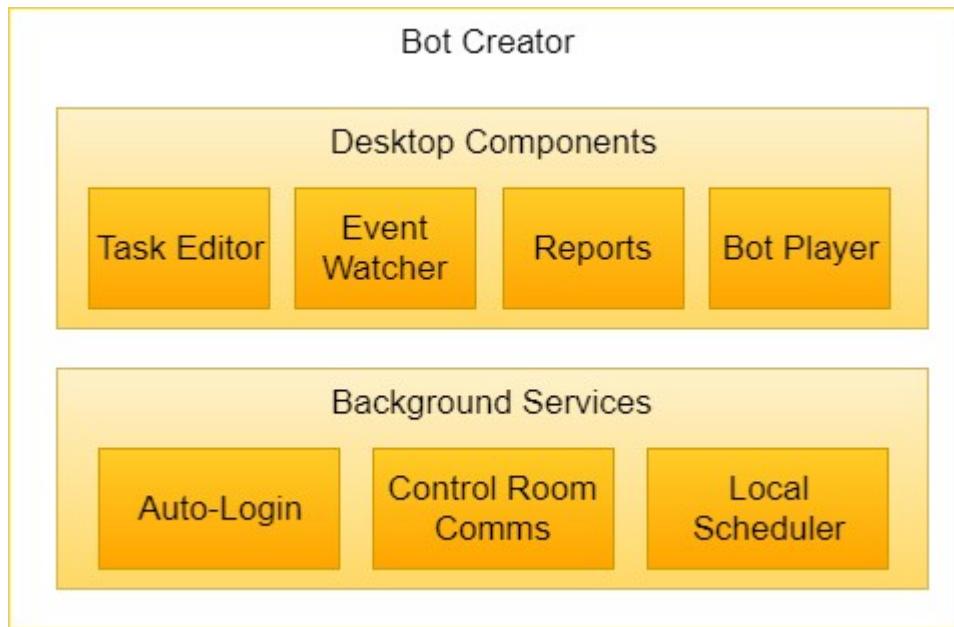
#### [Bot Runner overview](#)

The Bot Runner is the software machine that runs bots. When a bot is created using Bot Creator, then Bot Runners can run bots at scale.

## Bot Creator overview

A bot is a self-contained task designed to run with little-to-no human intervention. The Bot Creator is the Automation Anywhere proprietary development client used to author bots. This includes Task Editor, event watcher, bot Player, Auto Login, and local scheduler.

The Bot Creator contains user interface components and background services.



Bot Creator user interface components include:

#### Task editor

A workbench used when creating a bot. It provides a commands panel, task actions list for design and/or code views, actions buttons, variable manager panels, filters, and search. See [Create a bot](#).

#### Event watcher

An executable service. See [Viewing System Logs](#).

#### Reports

Graphical reports that display the status of tasks and workflows, as well as the ROI over time. See [What is a Report?](#).

#### Bot Player

Service invoked by the Enterprise client. See [Postupgrade checklist](#).

Bot Creator background services provide the following functions:

#### Auto-login

Bots logging into the target machines to complete tasks, using the provided credentials.

#### Enterprise Control Room communications

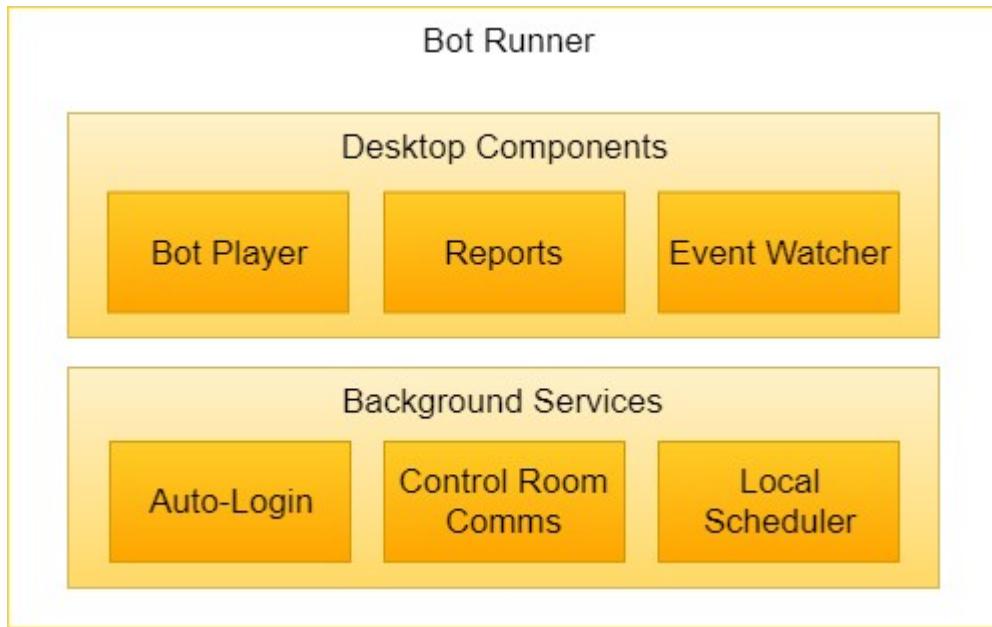
Managing communication between the Enterprise client and Enterprise Control Room.

#### Local scheduler

Component that runs the bots per the specified schedule on the machine that is local relative to the bot tasks.

## Bot Runner overview

The Bot Runner is the software machine that runs bots. When a bot is created using Bot Creator, then Bot Runners can run bots at scale.



Bot Runner Desktop Components provide the following interfaces for users to perform tasks:

#### Event watcher

An executable service. See [Viewing System Logs](#).

#### Reports

Graphical reports that display the status of tasks and workflows, as well as the ROI over time. See [What is a Report?](#).

#### bot Player

Service invoked by the Enterprise client. See [Postupgrade checklist](#).

Bot Runner Background Services perform the following functions:

#### Auto-login

Bots logging into the target machines to perform tasks, using the provided credentials.

#### Enterprise Control Room communications

Managing communication between the Enterprise client and Enterprise Control Room.

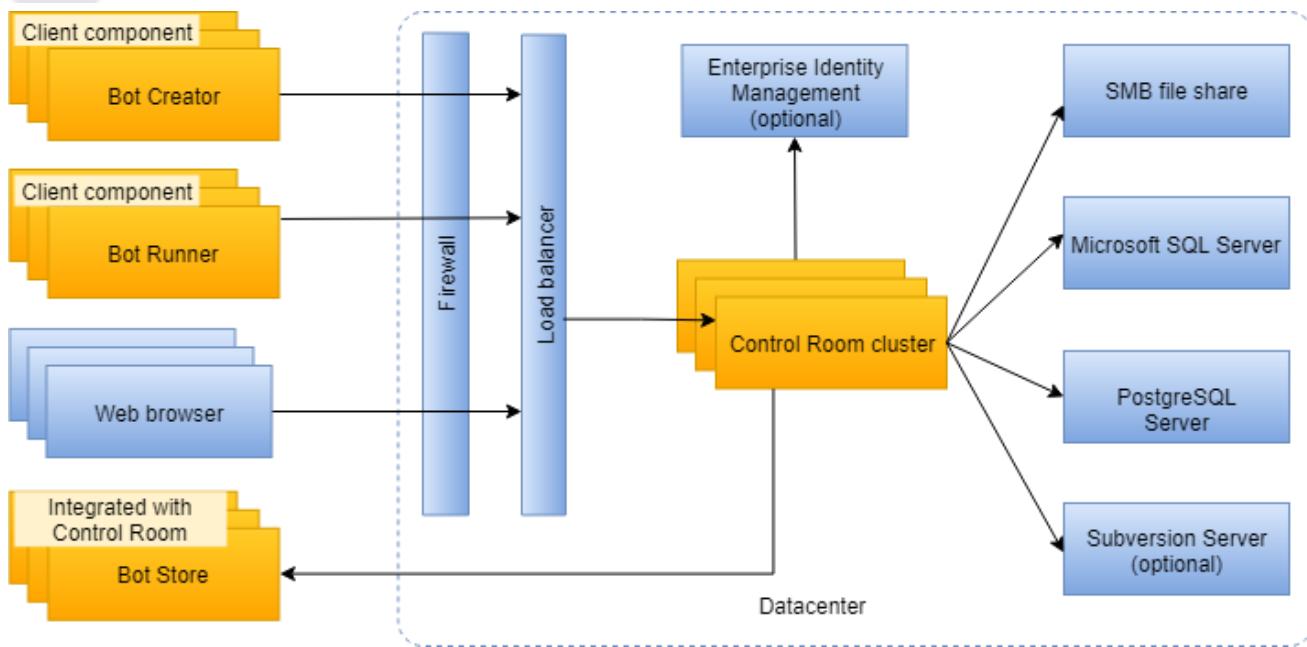
#### Local scheduler

Component that runs the bots per the specified schedule on the machine that is local relative to the bot tasks.

## Deployed components

Describes the required and optional components used in Automation Anywhere data center installations.

The following shows how the Automation Anywhere components interact with your data center. Objects in orange are Automation Anywhere components. Objects in blue are provided by your organization.

**11.3.3**

Core Automation Anywhere functionality is distributed between the Enterprise client and the Enterprise Control Room across the data center.

Within the data center, the Enterprise Control Room cluster communicates with the Enterprise client functions:

- Bot Creator
- Bot Runner
- Web browser

**11.3.3** The Enterprise Control Room is integrated with Bot Store. You can download bots to and from the Bot Store servers.

Data center provided functions used by the Enterprise Control Room include:

- Firewall
- Load balancer
- Enterprise identity management, (optional) for example Microsoft Active Directory (AD).
- SMB (Server Message Block) file share
- Microsoft SQL Server
- PostgreSQL Server
- Subversion server (optional)
- [Automation Anywhere configuration and properties files](#)  
Installed Automation Anywhere Enterprise files that manage scheduling, auto login, and client configuration files for Bot Runner and Bot Creators.
- [Verifying Automation Anywhere Windows services](#)  
Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

- [System default licenses](#)

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. This topic describes the available default product licenses.

- [System created roles](#)

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. This topic describes the default roles and their associated permissions.

## Automation Anywhere configuration and properties files

Installed Automation Anywhere Enterprise files that manage scheduling, auto login, and client configuration files for Bot Runner and Bot Creators.

The default installation location for many configuration files is:

```
C:\Program Files\Automation Anywhere\Enterprise\
```

The minimum installed configuration files include:

### Installation license keys

Request the installer and appropriate license keys from your account manager.

See product documentation for the Automation Anywhere Control Room and Enterprise client installation steps.

### Bot Creator schedules configuration files

- Configuration File Name : `Settings.xml`

- Configuration File Location :

```
C:\Users\Public\Documents\Automation Schedules
```

- Log File Name: `SchedulerServiceLogFile.txt`

- Log File Location :

```
C:\Users\Public\Documents\Automation Schedules\LogFiles
```

### AutoLogin configuration files

- Configuration File Name : `Automation.Autologin.Settings.xml`

- Configuration File Location :

```
C:\Users\Public\Documents\Automation Autologin
```

### Client configuration files

- Configuration File Name : `AA.Settings.xml`

- Configuration File Location :

C:\Users\aaadmin\Documents\AutomationAnywhereFiles

#### Database configuration files

The database connection string is configured in:

- Configuration File Name : boot.db.properties
- Configuration File Location : <installation\_location>\config\

#### Version control

Version control is through Subversion (SVN). Configure the location through the Enterprise Control Room UI.

Additional configuration files that are created as needed, include:

#### Cluster configuration

- Configuration File Name : cluster.properties
- Configuration File Location : <installation\_location>\config\

#### Key distribution center (KDC)

- Configuration File Name : um.properties
- Configuration File Location : <installation\_location>\config\

#### Parallel repository tuning

- Configuration File Name : boot.server.properties
- Configuration File Location : <installation\_location>\config\

#### Remote Desktop Protocol (RDP)

- Configuration File Name : deployment.properties
- Configuration File Location : <installation\_location>\config\

#### URL resources

- Configuration File Name : DWMP\_CONNECTIONS.properties
- Configuration File Location : <installation\_location>\DWAService\bin\src\main\resources\

#### White list restrictions

- Configuration File Name : repository.properties

- Configuration File Location :<installation\_location>\config\

Workload management

- Configuration File Name : `wlm.properties`
- Configuration File Location :<installation\_location>\config\

Zoomdata

- Configuration File Names : `zoomdata.properties`, `scheduler.properties`, `query-engine.properties`, `edc-mssql.properties`
- Configuration File Location :<installation\_location>\zoomdata\conf\

Verifying Automation Anywhere Windows services

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

## To verify installed Windows services

From your Windows device:

1. Select Control Panel > Administrator Tools > Services.

The specific path to Services can vary, depending upon your specific Windows version.

2. Scroll through the list to find the listed service name. Note the Status.

## Enterprise Control Room Windows services

Verify that the following Windows services are installed by the Automation Anywhere Enterprise Control Room installer.

Service Name	Description
Automation Anywhere Bot Insight EDC	Used to extract data from Automation Anywhere databases to create dashboards.
Automation Anywhere Bot Insight Elastic Search	Enterprise connector to pull data from Elasticsearch based data source into the dashboard.
Automation Anywhere Bot Insight PostgreSQL Server	PostgreSQL database server for use by Automation Anywhere.

Service Name	Description
Automation Anywhere Bot Insight Query Engine	Controls and manages queries, including all filtering and data manipulation on the dashboard.
Automation Anywhere Bot Insight Scheduler	Periodically updates Automation Anywhere dashboards. This service connects to the Bot Insight Visualization service to update the database.
Automation Anywhere Bot Insight Service	Receives and processes API requests for Bot Insight.
Automation Anywhere Bot Insight Service Discovery	Provides the ability for Bot Insight services to find each other.
Automation Anywhere Bot Insight Visualization	Renders service requests for dashboards within the Bot Insight application. Any request that pertains to adding, configuring, or deleting widgets goes through this service.
Automation Anywhere Control Room Caching	Used for distributed cache storage.
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 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 more information, Elasticsearch documentation can be found <a href="#">here</a> .

Service Name	Description
Automation Anywhere Licensing	Manages licensing information for Automation Anywhere products and services.

Note: All the services can be configured either in Local System or Domain account when the Enterprise Control Room is installed in Custom mode. For a Enterprise Control Room installed in Express mode, all the services are run in Local System account.

## Enterprise client Windows services

Verify that the following Windows services are installed by the Enterprise client installer.

Service	Description
<a href="#">AAAutoLoginService</a> , Automation Anywhere Enterprise Auto Login Service	This service provides support for automatic login functionality in the .
<a href="#">AAClientService</a> , Automation Anywhere Enterprise Client Service	This service provides support for the client services functionality in theEnterprise client.
<a href="#">AAESchedulerService</a> , Automation Anywhere Enterprise Scheduler Service	This service provides support for Scheduling functionality in the Enterprise client.

### Related concepts

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

### Related tasks

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

## System default licenses

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. 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.

Product licenses	Device licenses	Privileges enabled
Enterprise Control Room	None	The user has access only to the Enterprise Control Room. No Auto Login.

Product licenses	Device licenses	Privileges enabled
Enterprise Control Room	Bot Creator (Development)	<p>Auto Login enabled by default. Clear the checkbox to disable.</p> <p>Enables user to create and run bots.</p> <p>Select the IQ Bot checkbox to grant a license to run IQ Bots.</p>
BotFarm	Attended Bot Runner (Runtime)	<p>Auto Login enabled by default. Clear the checkbox to disable.</p> <p>License issued as number of users.</p> <p>Enables user to run bots on workstations using the Enterprise client using schedules and triggers for time or event based automation.</p> <p>Select the IQ Bot checkbox to grant license to run IQ Bots.</p>
BotFarm	Unattended Bot Runner (Runtime)	<p>Auto Login always enabled.</p> <p>License issued as number of users.</p> <p>Same user privileges as an Attended Bot Runner, enables user to run bots using schedules and triggers, adds performing Enterprise Control Room deployment, centralized scheduling, and API based deployment.</p> <p>Select the IQ Bot checkbox to grant a license to run IQ Bots.</p>
IQ Bot	IQ Bot	<p>Run IQ Bots within the parent TaskBots.</p> <p>The IQ Bot license number of users can be distributed</p>

Product licenses	Device licenses	Privileges enabled
		between Unattended and Attended Bot Runners.  For example, if you have 50 licenses, you can allot any number between 0-50 to Unattended and/or Attended Bot Runners. The total licenses distributed to Unattended and Attended Bot Runners cannot exceed 50.
BotFarm	BotFarm (Runtime)	Issued as a number of hours used by all runtime clients within BotFarm for executing a bot.
Bot Insight	Bot Insight Business Analytics	Grants number of users a Business Analytics role. License counts distributed between Bot Insight Admin, Bot Insight Consumer, or Bot Insight Expert.
Bot Insight	Bot Insight API	Grants number of rows that the API fetches from the Bot Insight database.
Trial License		A trial license is shipped with validity of 30 days; on expiry of <a href="#">Trial license</a> the user must contact System Administrator or Automation Anywhere Sales to purchase a new license.

## System created roles

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. This topic describes the default roles and their associated permissions.

Access to Automation Anywhere functions is defined by a combination of licensing applied to the Enterprise Control Room and the roles assigned to the user.

System created roles are pre-configured during Enterprise Control Room installation. These roles cannot be deleted or edited. You can only assign or unassign these roles to users.

Default Roles	Description
AAE_Admin	Permits 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	Permits users to upload and download TaskBots in the My Tasks folder. Limited access to other features.
AAE_Bot Insight Admin	Permits users to view and manage data in Bot Insight. Limited access to Enterprise Control Room features. (If Bot Insight license is installed).  It 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	Permits users to view data in Bot Insight and limited access to Enterprise Control Room features. (If Bot Insight license is installed)
AAE_Bot Insight Expert	Permits users to manage data in Bot Insight and limited access to Enterprise Control Room features. (If Bot Insight license is installed)
AAE_Bot Store Consumer	Permits users to download a bot package or a Digital Worker from the Bot Store to the Enterprise Control Room repository.
AAE_BotFarm Admin	Permits users access to BotFarm admin privileges.
AAE_BotFarm Agent	Permits users to view and manage privileges to the user.
AAE_IQ Bot Admin	Permits users to access the IQ Bot admin privileges.
AAE_IQ Bot Services	Permits users to access the IQ Bot console and limited access to Enterprise Control Room features.
AAE_IQ Bot Validator	Permits users to access the IQ Bot Validator screen and limited access to Enterprise Control Room features. (For a Bot Runner with an IQ Bot license)
AAE_Locker Admin	Permits users to view all credentials and all lockers. A Locker Admin 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.  Note: This permission is not applicable to Enterprise Control Room Admin role.
AAE_MetaBot Designer	Permits users to access Bot Creator MetaBot Designer from Enterprise client but does not allow the user to see any bots and/or supporting files.  Note: Migrated users (Bot Creator) who had access to MetaBot Designer in Enterprise Control Room 11.1 and less shall continue to have access to Designer.

Default Roles	Description
AAE_Pool Admin	Permits users 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	Permits users to view and manage all queues.

Note:

- Bot Insight, BotFarm, and IQ Bot roles are displayed only if you have respective licenses.

Related tasks

[Create a non-Active Directory user](#)

## Capacity and performance planning

To plan your deployment capacity and performance, 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 your best deployment scenario.

### Hardware requirements

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

- [Bot deployment and concurrent operations](#)  
List of maximum concurrent operations and estimated deployment times.
- [Bot Quality of Service priorities](#)  
Use of the concept Quality of Service (QoS) as it applies to availability of the Enterprise Control Room.
- [Bot concurrent schedules](#)  
Scheduling considerations when running bots repeatedly.
- [Bot Runner status processing](#)  
A method called rate limiting is applied to the rate at which status message from Bot Runners are processed.
- [Remote desktop bot sessions](#)  
Running a bot from the Enterprise Control Room uses a remote desktop session.
- [Workload management data import rate](#)  
The CSV import rate configured in workload management.

## Bot deployment and concurrent operations

List of maximum concurrent operations and estimated deployment times.

Automation Anywhere supports up-to 1000 simultaneous bot deployments and executions.

Entity Types and Counts	
Entity Type	Count
Users	5000
Roles	2000
Schedules	1500
Audit entries	5,000,000
Lockers	100
Credentials	5000
Repository files	2500
Repository folders	1250
Queues	10
Device pools	10
Work items	1,000,000

Concurrent deployment operations	
Action	Maximum concurrent operations
Deployment and execution	1000
Repository upload from Bot Creator	100
Repository download from Bot Creator	100

Deployment time estimates		
Number of devices	bot and dependencies total size	Approximate deployment time
1000	10 MB	1 minute
1000	50 MB	1 minute
1000	100 MB	5 minutes

Devices and the Control Room coordinate to implement a fair queuing strategy for download and uploads of chunked data to the repository.

As the number of devices simultaneously downloading and uploading increase, the time taken for the Control Room to start processing a chunk request increases. A device waits for up to two minutes for a response before timing out a request to upload or download. With the default limit of 10 parallel processed repository requests and simultaneous deployment and execution to 1000 devices, the average time to queue and process a chunk is approximately 10 seconds.

Note: Downloads and uploads from bot creators are subject to the same QoS policies as deployments.

## Tuning parallel repository operations

If the network connectivity between devices and the Enterprise Control Room is slower than the reference configuration, or the CPU is under-utilized during deployment, the number of parallel repository requests can be increased for better throughput.

If the CPU speed of the Enterprise Control Room is lower than the reference configuration or network speed is higher it may be necessary to lower the number of parallel repository requests allowed to avoid loss of availability due to excessive CPU utilization throughout deployment.

If during execution the Enterprise Control Room or database server experience a loss of availability due to excess CPU usage, the default of 10 parallel processed requests can be adjusted down.

To adjust the number of parallel repository requests:

1. Create a boot.server.properties file in the Program Files\Automation Anywhere\Enterprise\config directory if not already present.
2. Add the line:

```
requests.max.client.concurrent.repo=<number>
```

## Bot Quality of Service priorities

Use of the concept Quality of Service (QoS) as it 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 Creator or Bot Runner, 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 Runners make infrequent requests to other services on the Enterprise Control Room related to the deployment and execution process. Unlike repository requests, 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 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

Bot size	Concurrent schedules	Devices per schedule	Total concurrent bots	Overall execution time
1 MB	100	10	1000	4 minutes
10 MB	100	10	1000	9 minutes

## Bot Runner status processing

A method called rate limiting is applied to the rate at which status message from Bot Runners are processed.

How quickly status updates from Bot Runners are processed is rate limited. The rate limit is based on the Bot Runner's 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.

## Remote desktop bot sessions

Running a bot from the Enterprise Control Room uses a remote desktop session.

If the option Run bot runner session on control room is selected when running a bot, the Enterprise Control Room opens a Remote Desktop Protocol (RDP) session to the devices.

To determine the number of simultaneously supported RDP sessions possible:

- Divide the unallocated Enterprise Control Room memory by the memory usage of an individual RDP client. Typically, this is 75 MB.

To support more than 35 simultaneous RDP sessions:

1. Manually increase the amount of memory available for the non-interactive desktop heap size. To do this, edit the Windows registry value at:

```
HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager
\SubSystems
```

2. In the Windows registry, locate the SharedSection option. Change it to:

```
SharedSection=A,B,C
```

Table 1. SharedSection settings for RDP sessions

Section	Description	Default Value (KB)	New Value (KB)
A	Maximum size of the system-wide heap	1024	1024
B	Size of each interactive desktop heap	20480	20480
C	Size of non-interactive desktop heap	768	20480

## Workload management data import rate

The CSV import rate configured in workload management.

Data stored as comma separated values (CSV) files can be imported. By default, Workload management (WLM) is configured with a conservative CSV import rate to minimize resource utilization.

The workload management (WLM) 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.

For a more aggressive import strategy, configure the number of lines imported per batch and the interval between each batch.

Default CSV import rates			
Number of CSV Rows	Number of CSV Columns	Approximate time to upload (default)	Approximate time to upload (aggressive)
50,000	15	25 minutes	2 minutes
100,000	15	50 minutes	3.5 minutes
300,000	15	2.5 hours	10 minutes
1,000,000	12	8.5 hours	35 minutes

CSV import rate options		
Strategy	Number of lines per batch	Interval between each batch
Default	1000	30 seconds
Aggressive	10,000	10 seconds

To change strategy use the following procedure:

1. Create a wlm.properties file in the Program Files\Automation Anywhere\Enterprise\config directory, if not already present.
2. Add the lines:

```
workOrder.execution.job.interval.seconds=<interval in seconds>
workOrder.max.execute.lines=<number of lines per batch>
```

## Deployment requirements and planning

Use these data center prerequisites, hardware and software requirements, pre-configuration, and planning specifications to prepare for Automation Anywhere deployment and use.

When you deploy Automation Anywhere Enterprise in a data center for production use, verify the required and supported data center components, configuration, and options.

Note: All listed items are supported as of Automation Anywhere Version 11.3, unless otherwise indicated.

Note: Always use the exact same operating system and configuration in your test and production environments to ensure bots work identically in both test and production.

- [Enterprise Control Room prerequisites](#)

Verify the hardware, software, and configuration required to install Enterprise Control Room. Confirm the data center is configured to support the Enterprise Control Room and its functions.

- [Enterprise client prerequisites](#)

Verify the machine and configuration you are using to install the Enterprise client.

- [Data center requirements](#)

Automation Anywhere Enterprise is deployed on servers in a data center. This topic lists the data center requirements and provides links to full descriptions of each requirement.

- [Hardware requirements](#)

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

- [Operating system and platform compatibility](#)

Enterprise Control Room and Enterprise client both are installed on machines with supported operating systems. The Enterprise Control Room and Enterprise client tables list the supported Windows versions.

- [Supported browsers](#)

Supported browsers are used to access the Enterprise Control Room. In the Enterprise client, build bots with tasks that use a supported browser. Some tasks and functions require an Automation Anywhere plug-in.

- [Supported plug-ins and services](#)

Enterprise Control Room and Enterprise client require and support the listed Microsoft Windows services and browser plug-ins. Some are optionally installed with Automation Anywhere Enterprise deployment.

- [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.

Related concepts

[Enterprise client installation](#)

Related reference

[Enterprise Control Room installation](#)

## Enterprise Control Room prerequisites

Verify the hardware, software, and configuration required to install Enterprise Control Room. Confirm the data center is configured to support the Enterprise Control Room and its functions.

The Enterprise Control Room is installed on servers in a data center. The servers can be physical or a virtual machine as an instance with a cloud provider, such as Microsoft Azure or Amazon Web Services.

## Hardware requirements

### [Hardware requirements](#)

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

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# Data center requirements

## Database requirements

Two database instances of the same database type are created during Automation Anywhere installation. 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.

## 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.

## Network data rate requirements

The data transmission rates required between Automation Anywhere components and the data center are listed.

## Version control requirements

Optionally, install a supported version control system in your Automation Anywhere data center.

## Supported browsers

Supported browsers are used to access the Enterprise Control Room. In the Enterprise client, build bots with tasks that use a supported browser. Some tasks and functions require an Automation Anywhere plug-in.

## Capacity and performance planning

To plan your deployment capacity and performance, understand the requirements, limits, and defaults that determine the number of simultaneous bots, user sessions, and processing rates.

## HA, DR, 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, Highly Available (HA) clusters at single locations, and Disaster Recovery (DR) across geographically separated sites.

## High Availability deployment model

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

## Disaster Recovery deployment model

The Disaster Recovery (DR) deployment model uses high availability (HA) clusters distributed over a geographic area.

## Related concepts

### [Enterprise client installation](#)

## Related reference

### [Enterprise Control Room installation](#)

## Enterprise client prerequisites

Verify the machine and configuration you are using to install the Enterprise client.

The Enterprise client is installed on any device running the supported operating system. This can be a physical or virtual machine. It can be installed on the same server as the Enterprise Control Room although typically installation is on separate machines.

### [Hardware requirements](#)

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

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### [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.

### [Version compatibility matrix](#)

Before you install or upgrade verify the compatible of your Automation Anywhere Enterprise Control Room and Enterprise client versions.

### [Enterprise Control Room installation](#)

Review the installation core tasks and topics for installing Enterprise Control Room in a data center on an on-premise server or a cloud service provider server instance.

#### Related concepts

##### [Enterprise client installation](#)

#### Related reference

##### [Enterprise Control Room installation](#)

## Data center requirements

Automation Anywhere Enterprise is deployed on servers in a data center. This topic lists the data center requirements and provides links to full descriptions of each requirement.

Click the list item to view additional information. If you are deploying to an Enterprise production environment Automation Anywhere is deployed across multiple servers in both High Availability and Disaster Recovery configurations for maximum data protection and bot functionality. The following describes the data center configuration requirements.

### [Database requirements](#)

Two database instances of the same database type are created during Automation Anywhere installation. 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](#)

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

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

### [Disaster Recovery deployment model](#)

The Disaster Recovery (DR) deployment model uses high availability (HA) clusters distributed over a geographic area.

## Related reference

[Automation Anywhere Enterprise architecture](#)

[Enterprise Control Room prerequisites](#)

[Enterprise client prerequisites](#)

## Database requirements

Two database instances of the same database type are created during Automation Anywhere installation. View the list of supported databases, database server type, version, hardware, and operating system requirements, and database backup and recovery requirements.

## Automation Anywhere databases

Automation Anywhere installation creates databases to store bot data and metadata for the analytics dashboards.

- Database for Enterprise Control Room
- Databases for Bot Insight and Bot Insight metadata

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.

Database for component	Default database name
Enterprise Control Room	CRDC-NEW
Bot Insight	BotInsight
Bot Insight metadata	BIVisualization BIVisualization-keyset BIVisualization-scheduler BIVisualization-upload

## 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
PostgreSQL Server database	2-core Intel Xeon Processor	4 GB	10 GB	1 GbE
Oracle Server database	8-core Intel Xeon Processor	32 GB	50 GB	5 GbE

## Database server version and operating system requirements

One of either a Microsoft SQL Server database or Oracle Database required.

Database type	Database version	Installed database OS	Configuration requirement
Microsoft SQL Server database	2017	Windows Server 2008 R2 Standard or later	Installed and configured.
	2016		Only option for Express Installations
	2014 SP1		Enable protocols for Named Pipes and TCP/IP.
	2012		See <a href="#">Working with SQL Servers</a> .
	For Microsoft Azure installations, use version 2014,		

Database type	Database version	Installed database OS	Configuration requirement
	12.0.2000.8 (RTM) or later		
Oracle Database	12.1.0.2.v13	Server 2016 Datacenter	<p>Installed and configured.</p> <p>Only allowed with Custom Installations.</p> <p>Install JDBC driver on Enterprise Control Room server.</p> <p>Create users for Automation Anywhere to access the database.</p>
PostgreSQL Server database	9.5.14	Windows Server 2008 R2 Standard or later, Red Hat Enterprise Linux, or Ubuntu LTS	<p>Optionally installed with Enterprise Control Room.</p> <p>Supports metadata related to analytics dashboards only.</p> <p>Configure PostgreSQL Server as PaaS and enable SSL.</p> <p>For Microsoft Azure installations, disable SSL.</p>

## Database backup and recovery requirements and schedules

Database action	Requirement
Backup database process	<ul style="list-style-type: none"> <li>Follow your standard best practices.</li> <li>Verify that your database backups and file system backups are in sync.</li> </ul> <p>Backups are used to maintain consistency between the database and</p>

Database action	Requirement
	the file system. Database backups are used in recovery processes.
Backup maintenance schedule	<ul style="list-style-type: none"> <li>• Weekly: Full database backup.</li> <li>• Every 3 Days: Differential backups.</li> <li>• Daily: Incremental backups every 24 hours.</li> <li>• Hourly: Transaction log backup every hour.</li> </ul>
Backup installation and configuration files	<p>Files are listed in <a href="#">Automation Anywhere configuration and properties files</a>. This includes:</p> <ul style="list-style-type: none"> <li>• Bot Creator schedules configuration files</li> <li>• AutoLogin configuration files</li> <li>• Enterprise client configurations files</li> <li>• Database configuration files</li> </ul>
Configure Microsoft SQL Server database	<ul style="list-style-type: none"> <li>• Integrate with Automation Anywhere. See <a href="#">Working with SQL Servers</a>.</li> <li>• For complete Microsoft SQL Server information. See the Windows documentation at: <ul style="list-style-type: none"> <li>• <a href="https://docs.microsoft.com/en-us/sql/relational-databases/backup-restore/create-a-full-database-backup-sql-server?view=sql-server-2017">https://docs.microsoft.com/en-us/sql/relational-databases/backup-restore/create-a-full-database-backup-sql-server?view=sql-server-2017</a></li> <li>• <a href="https://docs.microsoft.com/en-us/sql/relational-databases/backup-restore/recovery-models-sql-server?view=sql-server-2017">https://docs.microsoft.com/en-us/sql/relational-databases/backup-restore/recovery-models-sql-server?view=sql-server-2017</a></li> </ul> </li> <li>• Alternatively, manage the backup and recovery processes based on third-party applications, for example, <a href="#">SQL Server Management Studio</a>. Then automate this process using an Automation Anywhere bot.</li> </ul>

## 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. See [Configure database type and server](#). The following table summarizes the required information.

Microsoft SQL Server database	
Required information	Description
Database (SQL Server) authentication	Provide credentials for a Microsoft SQL Server user who has permission to connect to the database.
Database names	Ensure the database names for Enterprise Control Room and Bot Insight are the same with Microsoft Azure installations.  Database names cannot be blank, have spaces, or include a % (percent character). Restrict the names to alphanumeric, period (.), dash (-), and underscore (_).
Database port	Default: 1433
Secure connection (optional) and certificate	Provide a CA certificate. Ensure the certificate host name and database connection are the same. See <a href="#">Import a CA certificate</a> .
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 Owner (DBO) 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.

Oracle database	
Required information	Description
Bot Insight database instance name	Created when database was created.
Bot Insight database instance credentials	Username and password  Provide a user with system administrator or Database Owner (DBO) permission to create databases during installation.
Database port	Default 1521

Oracle database	
Required information	Description
Database server	<p>Provide Oracle Database server host name details, including IP address and user credentials.</p> <p>Provide the user with system administrator or Database Owner (DBO) permission to create databases during installation.</p>
Enterprise Control Room database instance name	Created when database was created.
Enterprise Control Room database user credentials	<p>Username and password</p> <p>Provide a user with system administrator or Database Owner (DBO) permission to create databases during installation.</p>
Secure connection (optional) and certificate	Provide a CA certificate. Ensure the certificate host name and database connection are the same. See <a href="#">Import a CA certificate</a> .

- [Working with SQL Servers](#)

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

## Working with SQL Servers

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

### Configuring SQL Server Settings

[SQL Server](#) settings can be configured in the SQL Server Configuration Manager.

1. Enable protocols for Named Pipes and TCP/IP in SQL Server Network Configuration > Protocols for MSSQLSERVER.
2. Double-click TCP/IP to open the properties window.
3. Input the port number for IPAll in the IP Addresses tab of the TCP/IP Properties window.
4. Click OK.
5. Restart the MSSQLSERVICE for the updates to take effect.

## Database and Services Matrix

See [Database requirements](#) 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><a href="#">Database</a></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.

## 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.

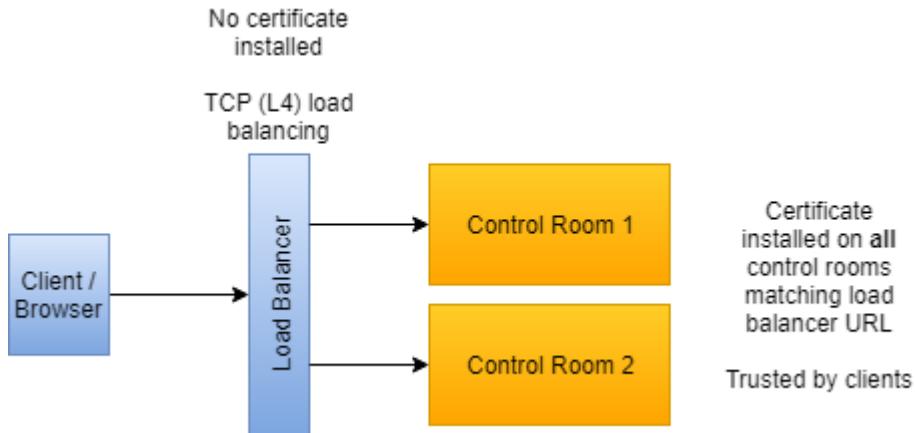
## Load Balancer Minimum Requirements

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:

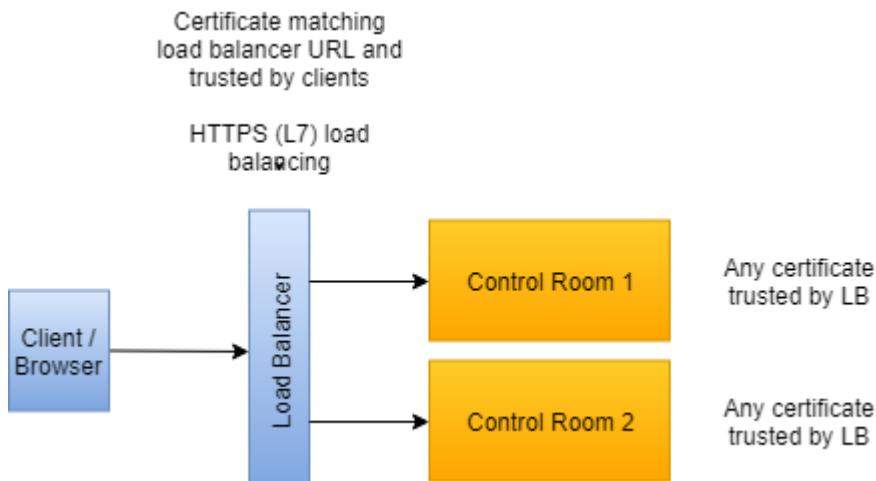
- End-to-end encryption without the possibility of intercept at the load balancer.
- Single certificate required.

Cons:

- If audit logging is required, the load balancer cannot report the requests from clients.
- Does not utilize 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 for Enterprise Control Room and Enterprise client, that includes Bot Creator and Bot Runner activity. The following tables list required ports and their use.

### Enterprise client required ports

Protocol	Ports	Rule
TCP	943 and 4530	Client inbound

### Enterprise Control Room required ports

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, excepting the Enterprise Control Room servers, block all other network hosts from accessing the listed Automation Anywhere cluster communication ports.

Note: The open ports listed here do not include ports that are inaccessible to remote hosts, as they are bound to the local host and typically dynamically assigned.

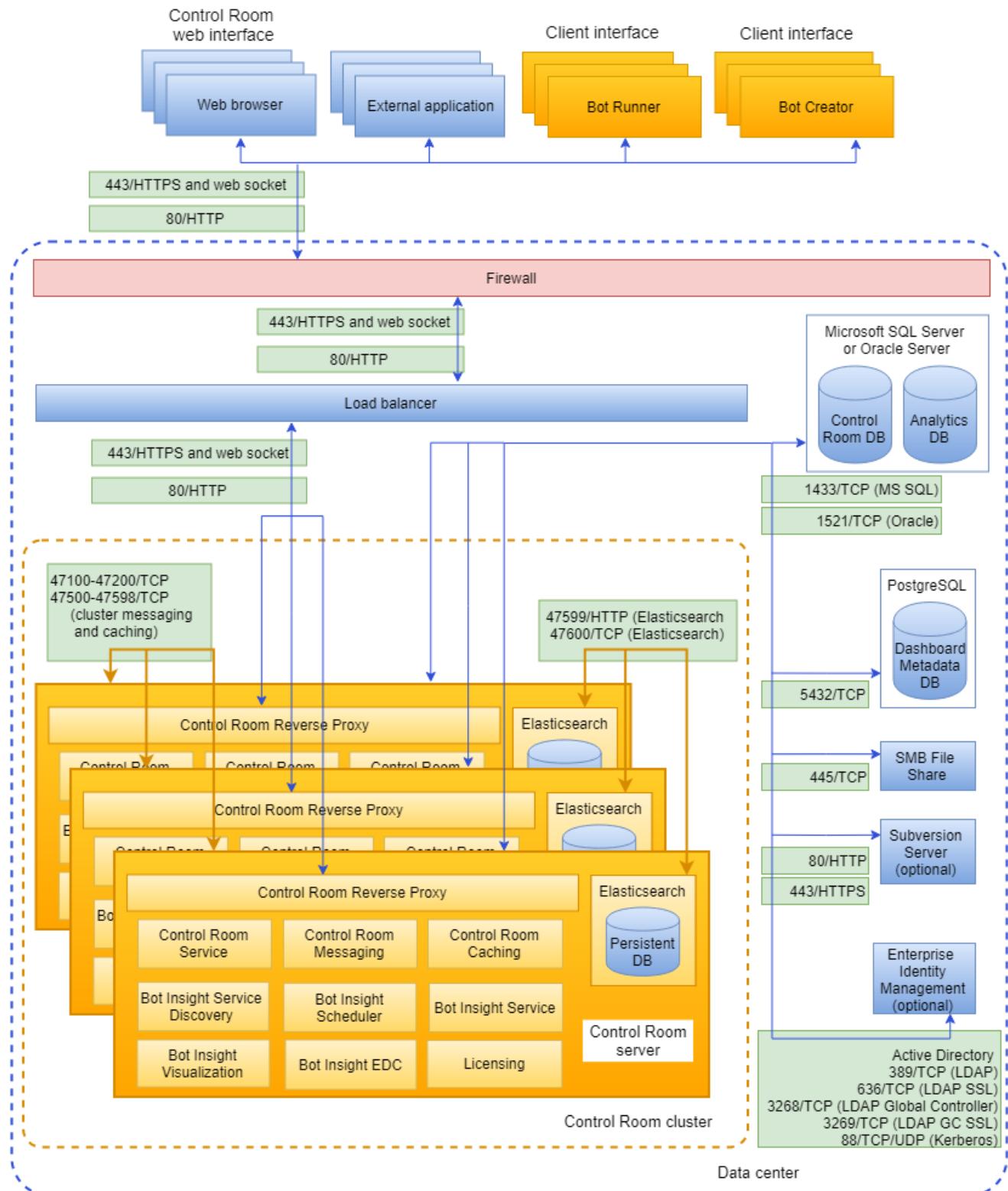
The following table lists the open port requirements. Unless noted, open the ports on the Enterprise Control Room server.

Protocol	Incoming Port	Usage	What's Connecting
HTTP	80	HTTP	Web browsers Bot Runners Bot Creators
HTTPS	443	HTTPS and	Web browsers

Protocol	Incoming Port	Usage	What's Connecting
		Web Socket	Bot Runners Bot Creators
TCP	1433	Microsoft SQL Server	Enterprise Control Room Services Bot Insight services In this case, open the port on Microsoft SQL Server, not the Enterprise Control Room.
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
TCP	47100 – 47200	Cluster Messaging and Caching	Open ports on both the Enterprise Control Room and the IQ Bot servers
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.

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)	
Subversion server	443	HTTPS and web socket	Change default from Enterprise Control Room Settings page.
	80	HTTP	
Microsoft SMB file share	445	TCP	
Postgre SQL	5432	TCP	Override default at Enterprise Control Room installation.
Microsoft SQL database server	1433	TCP	Override default at Enterprise Control Room installation.
Oracle database server	1521	TCP	Override default at Enterprise Control Room installation.

## Microsoft Azure supported data center elements

Data center object	Version	Configuration
Enterprise Control Room operating system	Windows 2016	IaaS
Enterprise client operating system	Windows 2012 R2	IaaS
Identity management: <a href="#">Azure Active Directory</a>	Azure Active Directory	IDAaaS Windows 2016 for IaaS
<a href="#">SMB File Share</a>	Azure File Share	PaaS (50 GB)
<a href="#">Load Balancer</a>	Azure Load Balancer (Not Application Gateway)	PaaS
<a href="#">PostgreSQL Server</a>	Azure PostgreSQL (9.5.14 and SSL Disabled)	PaaS
<a href="#">Microsoft SQL Server</a>	Azure SQL Database (Microsoft SQL Azure (RTM) - 12.0.2000.8)	PaaS
<a href="#">Subversion server</a>	Bitnami Subversion 1.10.0-0 (Linux)	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

## Email server ports

When creating bots, use the listed ports and SMTP host names.

Server	Host Name	Supported Ports
Outlook/Office 365	smtp-mail.outlook.com	25, 587
Gmail	smtp.gmail.com	465, 587
Yahoo	smtp.mail.yahoo.com	25, 465
Hotmail	smtp.live.com	587

## Network data rate requirements

The data transmission rates required between Automation Anywhere components and the data center are listed.

Ensure the network supports the following data transfer rates. Bot Creator and Bot Runner are users in the Enterprise client network.

Network	Enterprise client	Enterprise Control Room	Microsoft SQL Server	Oracle Server	PostgreSQL Server
Data transfer	1 GbE	10 GbE	1 GbE	5 GbE	1 GbE

## Version control requirements

Optionally, install a supported version control system in your Automation Anywhere data center.

## Version control integration

Create the Subversion repository and give the Subversion administrator user Enterprise Control Room administrator permissions. Subversion is provided by the Apache Subversion software project.

Component	Versions	Resides on	Notes
Apache Subversion	1.9.7	VisualSVN Server server 3.6.x	You have the option to configure your own instance of Subversion, however, VisualSVN Server is recommended.
	1.8.15	VisualSVN Server server 3.3.x	
	1.7.2	VisualSVN Server server 2.5.2	Subversion repository with administrator account required.
Bitnami Subversion Stack	1.10.0-0 (Linux)		Use for Microsoft Azure installations. Configure as PaaS.

## Hardware requirements

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

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, for every server or machine their:

- 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

## Enterprise Control Room server requirements

Enterprise Control Room must be installed on a server level machine. The server can be a physical machine in your data center or an instance on a cloud platform.

Component server	Processor	RAM	Storage (free disk space)	Network
Enterprise Control Room Servers	8 core Intel Xeon Processor	16 GB	500 GB	10 GbE
Enterprise Control Room on Amazon Web Services	8 core Intel Xeon Processor	16 GB	500 GB	10 GbE
Enterprise Control Room on Google Cloud Platform	8 core Intel Xeon Processor	16 GB	500 GB	10 GbE
Enterprise Control Room on Microsoft Azure	8 core Intel Xeon Processor	16 GB	500 GB	10 GbE

Note: Supported IQ Bot for server RAM.

- On 16 GB RAM Enterprise Control Room servers, install IQ Bot on separate 16 GB servers.
- On 32 GB RAM Enterprise Control Room servers, install IQ Bot on the same 32 GB server.

## Enterprise client machine requirements

Enterprise client can be installed on any machine that meets the listed requirements. The values listed are for the specific corresponding component. Bot Creator and Bot Runner requirements are included in the Enterprise client requirements.

Component server	Processor	RAM	Storage (free disk space)	Network
Enterprise client on hardware machines.	3.5 GHz+ with 4 multi-cores or higher	8 GB or more per machine	8 GB	1 GbE
Enterprise client on virtual machines.  Virtual machine options: <ul style="list-style-type: none"><li>• Citrix XenApp</li><li>• VMware Horizon Client version 4.8.0 or later</li><li>• Windows multi-user terminal servers</li></ul>	4 virtual CPU (vCPU) or Logical Processor with 1.2 to 1.5 GHz speed per vCPU	8 GB per virtual machine	8 GB	1 GbE
Enterprise client on cloud service.  Cloud provider options: <ul style="list-style-type: none"><li>• Amazon Web Services</li><li>• Google Cloud Platform</li><li>• Microsoft Azure</li></ul>	2 CPU per Automation Anywhere instance	8 GB per Automation Anywhere instance	8 GB	1 GbE

Component server	Processor	RAM	Storage (free disk space)	Network
Additional users on a multi-user system.	2 CPU per additional user	4 GB per additional user	No additional storage needed	No additional network needed.
Bot Creator and Bot Runner	Same as Enterprise client	Same as Enterprise client	Add 100 through 150 KB per Automation Anywhere script  Add 40 through 50 GB per long-term MetaBot project	Same as Enterprise client

RAM on Enterprise client machines:

- Enterprise client is a 32-bit application and multi-threaded, and it executes multiple tasks in parallel including running bots.
- Add additional RAM to account for applications and services running on the Enterprise client server, 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 Enterprise client machines:

- Automation Anywhere scripts average approximately 100-150 KB. Additional free disk space is required to develop automation projects, since creates temporary files like screen shots, server logs, and audit files, during the execution of the automation scripts.
- Free space required increases with the project size. It is recommended to 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, in MetaBot Designer, generating log files and logic creation, require additional disk space later.

## Operating system and platform compatibility

Enterprise Control Room and Enterprise client both are installed on machines with supported operating systems. The Enterprise Control Room and Enterprise client tables list the supported Windows versions.

Both 32-bit and 64-bit OS versions are supported.

## Enterprise Control Room operating system compatibility

Enterprise Control Room can be installed on machines running the following operating systems.

Windows version	Version edition
Server 2019	Standard and Datacenter
Server 2016	Standard and Datacenter
Server 2012 R2	Standard and Datacenter

## Enterprise Control Room platform compatibility

Enterprise Control Room versions support the listed operating systems on a variety of platforms:

### Servers

See [Hardware requirements](#). All listed operating systems and Enterprise Control Room versions.

### Cloud servers

AWS, Google Chrome, Microsoft Azure. All listed operating systems. See the table for which Enterprise Control Room versions.

Enterprise Control Room Version	Cloud			Data center
	Google Cloud Platform	Amazon Web Services	Microsoft Azure	On-premise server
Version 11.3.3	Y	Y	Y	Y
Version 11.3.2.3	N	Y	Y	Y
Version 11.3.2.2	N	Y	Y	Y
Version 11.3.2.1	N	Y	Y	Y
Version 11.3.2	N	Y	Y	Y
Version 11.3.1.4	N	N	Y	Y
Version 11.3.1.3	N	N	Y	Y
Version 11.3.1.2	N	N	Y	Y
Version 11.3.1.1	N	N	N	Y
Version 11.3.1	N	N	N	Y
Version 11.3	N	N	N	Y

## Enterprise client operating system compatibility

Enterprise client can be installed on machines running the following operating systems.

Windows version	Version editions
Server 2019 <sup>1,3</sup>	Standard and Datacenter

Windows version	Version editions
Server 2016 <sup>1,3</sup>	Standard and Datacenter
Server 2012 <sup>1</sup>	Standard
Server 2008 R2	Standard
Windows 10 <sup>1,2</sup>	Professional and Enterprise
Windows 8.1 and 8	Professional and Enterprise
Windows 7 SP1	Professional

#### Enterprise client components

Bot Creator and Bot Runner are compatible with the same operating systems as Enterprise client.  
 (1, 2) Windows 10

- Automation using Apache Flex technology is not supported.
- Microsoft Edge Automation and triggers are not supported.

(1) Windows Server 2012:

Automation using Apache Flex technology is not supported.

(1, 3) Windows Server 2016:

- Automation using Apache Flex technology is not supported.
- As of Automation Anywhere Version 11.3.2, this is no longer a limitation on Enterprise client with Windows Server 2016.

For Windows Server 2016 on Automation Anywhere versions older than Version 11.3.2:

When installing Enterprise client, to enable the AutoLogin feature for a Logoff scenario, ensure that the lock screen appears and that the CTRL+ALT+DEL action does not appear on the lock screen. To ensure this:

- Enable the Interactive logon: Do not require Ctrl+Alt+Del option available under Local Security Policy > Local Policies > Security Options.
- Disable the 'Do not display the lock screen' option available under Local Group Policy > Computer Configuration > Administrative Templates > Control Panel > Personalization

## Enterprise client platform compatibility

Enterprise client versions support the listed operating systems on a variety of platforms:

#### Physical machines

See [Hardware requirements](#). All listed operating systems and Enterprise client versions.

#### Terminal servers

Using remote desktop (RDP). All listed operating systems and Enterprise client versions.

#### Virtual machines

Using Citrix XenApp, VMware Horizon Client. All listed operating systems. See the table for which Enterprise client versions.

#### Cloud servers

Using AWS, Google Chrome, Microsoft Azure. All listed operating systems. See the table for which Enterprise client versions.

Enterprise client Version	Cloud			VM		RDP	Physical
	Google Cloud Platform	Amazon Web Services	Microsoft Azure	VMware Horizon Client	Citrix XenApp	Microsoft Terminal Servers	Machine
Version 11.3.3	Y	Y	Y	Y	Y	Y	Y
Version 11.3.2.3	N	Y	Y	Y	Y	Y	Y
Version 11.3.2.2	N	Y	Y	Y	Y	Y	Y
Version 11.3.2.1	N	Y	Y	Y	Y	Y	Y
Version 11.3.2	N	Y	Y	Y	Y	Y	Y
Version 11.3.1.4	N	N	Y	Y	Y	Y	Y
Version 11.3.1.3	N	N	Y	Y	Y	Y	Y
Version 11.3.1.2	N	N	Y	Y	Y	Y	Y
Version 11.3.1.1	N	N	N	N	N	N	Y
Version 11.3.1	N	N	N	N	N	N	Y
Version 11.3	N	N	N	N	N	N	Y

- [Auto Login compatibility](#)

Bots can Auto Login to the listed operating systems and environments.

Related concepts

[Enterprise client installation](#)

Related reference

[Enterprise Control Room installation](#)

## Auto Login compatibility

Bots can Auto Login to the listed operating systems and environments.

Use the Auto Login option to enable a bot to log into supported operating systems and environments. The listed operating systems are all supported in English. Additional language support is listed for specific Windows versions.

Windows 7  
 32 bit  
 64 bit  
11.3.3 Citrix (Xen Desktop)

11.3.3 Horizon VDI

Windows 8  
 32 bit  
 64 bit  
11.3.3 Windows 8.1

64 bit

Windows 10  
 64 bit  
 Japanese  
11.3.3 Citrix (Xen Desktop)

Horizon VDI

Windows Server 2008 R2  
 64 bit

Windows Server 2012  
 64 bit  
 Japanese

11.3.3 German

11.3.3 French

11.3.3 Windows Server 2012 R2  
 Citrix (Xen Desktop)

Windows Server 2016  
 64 bit

11.3.3 Spanish

Terminal

11.3.3 Citrix (Xen Desktop)

Specific actions, in combination can vary depending on the operating system and environment. Not all combinations have been tested. When logged in through Auto Login, bots can complete its tasks, with the following conditions:

Run bot schedule locally

The bot performs its tasks.

The bot runs its tasks when the machine is in the listed state.

Lock system

The bot runs on a virtual machine or physical machine that has a locked screen.

The bot unlocks the machine and after execution it locks the screen again.

Log off system

The bot is deployed on a virtual machine or physical machine that requires a login.

The bot logs on the machine and after execution it logs off from the machine.

Acknowledge legal disclaimer

If the system prompts for a legal disclaimer verification, and:

- The bot has the option Bypass Legal Disclaimer selected, the bot accepts the legal disclaimer and proceeds with its tasks.

- The bot does not have the option Bypass Legal Disclaimer selected, the bot fails.

If the system does not prompt for a legal disclaimer verification, and:

- The bot has the option Bypass Legal Disclaimer selected, the bot fails.
- The bot does not have the option Bypass Legal Disclaimer selected, the bot proceeds with its tasks.

#### Deploy bot

The bot can be deployed from the Enterprise Control Room on the machine.

The bot can deploy apps on the machine, as part of a task.

#### Remote Desktop (RDP) to another system

The bot can use RDP to login to the machine and execute its tasks.

#### Disconnect from RDP system

If the Enterprise Control Room is connected to the remote machine, then the bot can Auto Login to the machine, execute its tasks, and disconnect from the machine.

If the Enterprise Control Room is not connected to the remote machine, then the bot cannot auto login to the remote machine, and the bot fails.

#### Log into a Virtual Machine (VM)

The bot can login to a VM.

The bot can run from a VM

For Automation Anywhere versions prior to Version 11.3.3:

- Auto login cannot run bots in LOGOFF mode from cloud VMs (Azure, Amazon, Verizon etc).
- Auto login cannot run bots in LOGOFF & Disconnect mode from a Citrix system or Terminal server (multi-user session systems).
- Auto login cannot run the Legal Disclaimer from bots when the Remote Desktop Check Option is selected in the Enterprise Control Room.
- Auto Login runs LOGOFF on Windows Server 2016 from Remote Desktop inconsistently. Instead, use the bot scheduling option, Run Bot Runner session on Control Room.

#### Related concepts

[Auto Login](#)

#### Related tasks

[Setting Up Auto Login](#)

## Supported browsers

Supported browsers are used to access the Enterprise Control Room. In the Enterprise client, build bots with tasks that use a supported browser. Some tasks and functions require an Automation Anywhere plug-in.

Plug-ins for the listed browsers are optionally installed during Enterprise Control Room and Enterprise client installation. See [Supported plug-ins and services](#).

CAUTION: Google Chrome requires re-verification of permissions when the Automation Anywhere Google Chrome extension (version 11.x or later) is updated. If prompted, click Enable this item in the Google Chrome message. Alternatively, re-enable the extension through [chrome web store](#). Similarly, if you are deploying your Bot Runners from a master image, accept the permission from within that image.

## Enterprise Control Room installation supported browsers

Browser	Version	Notes
Google Chrome	57 or later	
Microsoft Edge		Microsoft Windows 10 machine only.
Microsoft Internet Explorer	10 or 11	
Mozilla Firefox	52 or later	

## Enterprise client installation supported browsers

Browser	Version	Notes
Google Chrome	49 or later	Standard > Screen Capture option is not supported for MetaBots. Use the Object Cloning command instead.  For Google Chrome Extension Version (12.0.0.0) use Enterprise client Version 11.3.3 or later.
Microsoft Edge	Windows 10 Anniversary Update or 41.16299 and above	Microsoft Windows 10 machine only.  MetaBot is not supported on Microsoft Edge.
Microsoft Internet Explorer	10 or 11	
Mozilla Firefox	56 or later	

## Enterprise client technology and operating system compatibility

Tables legend
Y, Yes or supported or available
Y*, Supported, but items are not browser dependent. Using a browser is supported, but is also optional to the command. For example, another application might use a browser and does not require the bot to run the browser.
N, No or not supported or not available

Tables legend
NA, Not Applicable
D, Deprecated

Environment	Technology											
Application Type	Standard (MSAA)	Advanced (UIAutomation) [1]		HTML				Java		Apache Flex	Silverlight	
	Windows	Web	Windows	Web	Internet Explore	Google Chrome	Firefox	Microsoft Edge	Windows	Web	Microsoft Internet Explorer	
Windows 7	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y
Windows 8.1	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	Y	Y
Windows 10	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
Windows 2012	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	N	N
Windows 2016	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y	N	N

Note 1

11.3.3 MetaBot support for Google Chrome with UIA and HTML technologies.

## Bot commands browser compatibility

The tables lists only those commands that require a browser to do their task. This table does not list commands or sub-commands that do not have any browser interaction.

Command	Subcommand	Google Chrome	Firefox	Microsoft Edge	Microsoft Internet Explorer
App Integration	Browser, DOS Command Prompt, Java Apple, Java Application, Telnet, Unix Shell, Windows	Y			Y

Command	Subcommand	Google Chrome	Firefox	Microsoft Edge	Microsoft Internet Explorer
	Application, Other				
If - Else if	Window Exists/Window Does Not Exist, Image Recognition	Y*		Y*	Y*
If - Else if	Web Control	N			Y
Insert Keystrokes		Y*		Y*	Y*
Image Recognition		Y*		Y*	Y*
Insert Mouse Click		Y*		Y*	Y*
Insert Mouse Move		Y*		Y*	Y*
Insert Mouse Scroll		Y*		Y*	Y*
Launch Website		Y	Y	Y*	Y
Loop	Start Loop	Y		Y	Y
Open Program File		Y*		Y*	Y*
	Capture Window, Capture Area, Capture Image by Path, Capture Image by URL	Y*		Y*	Y*
Screen Capture	Capture Window, Capture Area	Y*		Y*	Y*
Web Recorder	Open and close website browser				Y

Command	Subcommand	Google Chrome	Firefox	Microsoft Edge	Microsoft Internet Explorer
	sessions, Manage web controls, Download data, Extract additional data from web, Test websites and locate broken links, Navigate URLs, Extract Website source code, Search by captions, Navigate back, Execute a Java Script				
Metabot		Y[1]	N	N	Y

Note 1

11.3.3 | MetaBot support for Google Chrome with UIA and HTML technologies.

## Object Cloning with HTML Technology browser compatibility

Command	Subcommand	Microsoft Internet Explorer		Google Chrome		Microsoft Edge		Firefox	
		Record	Play	Record	Play	Record	Play	Record	Play
TextBox	Get Property, SetText, AppendText, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Button	Get Property, Click, LeftClick	Y	Y	Y	Y	Y	Y	Y	Y

Command	Subcommand	Microsoft Internet Explorer		Google Chrome		Microsoft Edge		Firefox	
		Record	Play	Record	Play	Record	Play	Record	Play
	RightClick, DoubleClick								
StaticText	Get Property, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Table	Get Property, ExportToCSV, GetCellTextByIndex,GetCellIndexByText,GetTotalRows,GetTotalColumns,SetCellByIndex, SetCellByText, Click, LeftClick,RightClick, DoubleClick, ClickCellByText,ClickCellByIndex	Y	Y	Y	Y	Y	Y	Y	Y
RadioButton	Select, Click, LeftClick,RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Checkbox	Get Property, GetStatus, Check, Toggle, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Checkbox	UnCheck	Y	Y	Y	N	N	N	Y	Y

Command	Subcommand	Microsoft Internet Explorer		Google Chrome		Microsoft Edge		Firefox	
		Record	Play	Record	Play	Record	Play	Record	Play
ComboBox	Get Property, GetTotalItems, GetSelectedIndex, GetSelectedText, SelectItemByText, SelectItemByIndex, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
ComboBox	Expand	N	N	N	N	N	N	N	N
ListView	Get Property, GetTotalItems, GetSelectedIndex, GetSelectedText, SelectItemByText, SelectItemByIndex, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Link	GetProperty, Click, LeftClick, Y RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y
Common [Client]	GetProperty, GetAllChildrenName, GetAllChildrenValue, Click, LeftClick, RightClick, DoubleClick	Y	Y	Y	Y	Y	Y	Y	Y

## Supported plug-ins and services

Enterprise Control Room and Enterprise client require and support the listed Microsoft Windows services and browser plug-ins. Some are optionally installed with Automation Anywhere Enterprise deployment.

**CAUTION:** Exclude anti-virus scans from running in the Automation Anywhere local repository because they interfere with running bots.

### Enterprise Control Room supported services and plug-ins

Plug-in / Service	Version	Notes
HTML		For Microsoft Azure: Use Load Balancer, not Application Gateway
Microsoft Active Directory		Configure as either IDaaS or IaaS  For IaaS use Windows 2016
Microsoft Internet Information Services (IIS) web server	8 or later.	Lightweight Directory Access Protocol (LDAP) and Kerberos supported
Microsoft .NET Framework <sup>[1]</sup> Required.	4.6, 4.6.1, or 4.7	4.6.1 only supported on Windows 8.1 or Windows Server 2012 R2
Microsoft OLEDB Driver for Microsoft SQL Server		For Microsoft Azure installations
Microsoft Visual C++ Redistributable for Visual Studio	2013 or later	For Microsoft Azure installations
Java Database Connectivity (JDBC) driver		For Oracle Database
Security Assertion Markup Language (SAML)	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) redistributables are installed.

## Enterprise client supported services and plug-ins

Plug-in / Service	Version	Notes / Requirements
ABBYY FineReader engine	11 or 12	For capturing images
Adobe ActionScript (Advanced Flex)	3.0	For recording tasks Technology support for Bot Creator.
AI Sense		For talk to text
Apache Flex	24 or 32	For recording Web tasks Not supported with Windows 10 and MetaBots, Windows Server 2012, or Windows Server 2016
Citrix Receiver	4.9.5000.9	Install the Citrix AAPPlugin on every Enterprise client  Citrix Receiver must be installed before installing Enterprise client. If you have installed Enterprise client before installing Citrix Receiver, you must uninstall Enterprise client and reinstall after installing Citrix Receiver
Citrix XenApp	7.15	Install the Citrix AAPPlugin on every Enterprise client
HTML		For recording Web tasks. Technology support for Bot Creator.
IBM WebSEAL		For reverse proxy  Trusted client certificate required on all Enterprise client machines
LinguaSol Linguify		For language translation

Plug-in / Service	Version	Notes / Requirements
Microsoft Active Accessibility (MSAA)		To import/export datasets Technology support for Bot Creator
Microsoft Active Directory		Configure as either IDaaS or IaaS For IaaS, use Windows 2016
Microsoft Office Document Imaging (MODI)	12.0	For OCR engine
Microsoft .NET Framework	4.6, 4.6.1, or 4.7	4.6.1 only supported on Windows 8.1 or Windows Server 2012 R2
Microsoft Visual C++ Redistributable for Visual Studio	2015 or later	For Enterprise Control Room installation
Windows Presentation Foundation (WPF)		For recording Web tasks
Oracle Java	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 Desktop (standalone) Java applications (running on JRE 6 or later versions) do not require the AAE Java plug-in Technology support for Bot Creator
Proxy service		For web service commands
SAP DLL for SAP Business Application Programming Interface (BAPI) integration	3.0.21.0	To automate tasks in SAP
PowerBuilder Platform	10.5	
Silverlight	5.1.x	For recording Web tasks Not supported in Windows 10 and MetaBots
SMB File Share		Configure as PaaS (50 GB) For Microsoft Azure installations, use Microsoft Azure File Share

Plug-in / Service	Version	Notes / Requirements
Tesseract Optical Character Reader (Tesseract OCR)	5.0	For OCR engine
Terminal emulator	Types: <ul style="list-style-type: none"> <li>• ANSI (default)</li> <li>• <a href="#">11.3.3</a> IBM-5555-XXX DBCS</li> <li>• VT Series VT100</li> <li>• <a href="#">11.3.3</a> VT Series VT220</li> <li>• TN3270</li> <li>• TN5250</li> </ul>	To access and control terminal hosts
UIAutomation		Technology support for Bot Creator
VMware Horizon	4.8.0	For installing the Enterprise client
Windows Communication Foundation (WCF), Transport Layer Security (TLS)	1.2	For secure communications

Related reference

[Supported browsers](#)

## 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	System administrator on hosting server.
Data center servers	Manage (run, stop, restart) Enterprise Control Room	Administrator and Logon as Service permission for Windows services and the Domain.
Databases	Installer creates databases for Enterprise Control Room and Bot Insight	Database Owner (DBO) permissions.
Enterprise client installation setup	Services and registry updates during installation, application or system updates	Administrator.

Access point	Task	Type
Enterprise client file access Default file location: C:\Program Data	bot Auto Login, bot schedules	Full control permissions.
Enterprise client folder access C:\Program Data\Properties\Security\Advanced\Permissions	Edit application files stored and used during run-time.	Client user requires read, write, and update permissions.
Automation Anywhere login	Perform specific tasks, such as create a bot or run a bot.	License and role based permissions.
Bot task	Used by bots to perform bot tasks.	Credential Vault stores securely created credentials.
Automation Anywhere Service	Run all Windows services created by Automation Anywhere	Local system account user or Domain user account.

#### 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 login 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

To login to Enterprise Control Room or Enterprise client interfaces require 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.
- For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.
- Have Database Owner (DBO) permissions.

The these 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

(default) The logged on user performing the installation.

### Domain User Account

A user that is not the local system account user.

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, or the Enterprise Control Room fails to launch.

- PowerShell script restrictions.

Specify a user with permissions to launch PowerShell scripts, that is not a Windows domain user, or database table creation can fail.

- Remote PostgreSQL Server for creating the database.

Specify a domain user account. Do not use the local system account user when you are using a remote database server for creating the database.

See [Database and Services Matrix](#).

## HA, DR, 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, Highly Available (HA) clusters at single locations, and Disaster Recovery (DR) across geographically separated sites.

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

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

A single-node deployment is used for some proof-of-concept deployments.

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

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

#### [Disaster Recovery deployment model](#)

The Disaster Recovery (DR) deployment model uses high availability (HA) clusters distributed over a geographic area.

### Related concepts

[High Availability and Disaster Recovery overview](#)

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## Deployed components

### Single-Node deployment

A single-node deployment is used for some proof-of-concept deployments.

A single-node Enterprise Control Room installation is deployed without the need of a load balancer. It is useful for some proof-of-concept deployments.

CAUTION: Do not use single-node installation for production workloads.

Pros

- Easy to setup and configure
- Only a single server required

Cons

- No disaster recovery
- No high availability
- Susceptible to hardware failures

Use Cases

- Proof of concept
- Single-user use scenarios

## High Availability and Disaster Recovery overview

High Availability (HA) provides a failover solution in the event a Enterprise Control Room service, server, or database fails. Disaster Recovery (DR) provides a recovery solution across a geographically separated distance in the event of a disaster that causes an entire data center to fail.

### Automation Anywhere HA and DR solution

In the context of Automation Anywhere, implementation of High Availability (HA) and Disaster Recovery (DR) 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.
- Disaster Recovery (DR)—involves a set of policies and procedures to enable the recovery or continuation of vital infrastructure and systems following a natural or human-induced disaster.

HA and DR are required for production deployments of Automation Anywhere.

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

## Required HA and DR infrastructure elements

- Distributed Approach—in addition to clustering Automation Anywhere and related data center components, we also recommend that you deploy the Enterprise Control Room and the Enterprise clients on separate machines.

Enterprise Control Room is flexible enough to process a large number of requests. Deploy multiple instances of either Enterprise Control Room or Enterprise client on multiple physical and/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/standby) 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
- Between the DR sites, configure your database to provide asynchronous replication from the primary (production) DR site to the secondary (recovery) DR site that is at a geographically separated location from the primary DR site.

## 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 and ensuring data integrity is maintained across Enterprise clients accessing Enterprise Control Rooms within a cluster.

## HA and DR deployment models

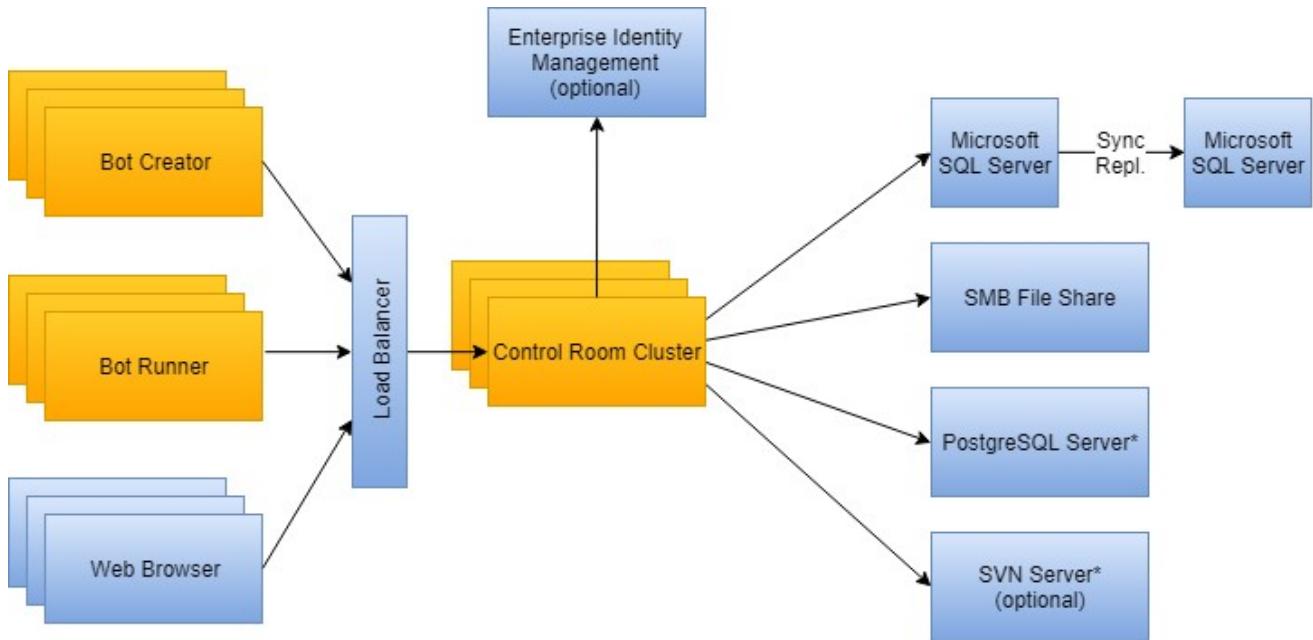
To ensure your Automation Anywhere is protected by HA and/or DR, configure your data centers according to the deployment models described in:

- [High Availability deployment model](#)
- [High Availability Disaster Recovery 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 shows the Automation Anywhere and data center components.



In this example, the Enterprise Control Room servers and Microsoft SQL Servers have HA redundancy. The asterisk (\*) on the PostgreSQL server and Subversion Version Control (SVN) server, indicate that those servers do not require HA redundancy. However, see [Graceful Degradation](#) for bot support if either of these fail.

- Multiple users have access the IQ Bot cluster through their web browsers. The web browsers communicate to the IQ Bot cluster through the load balancer.
- Multiple Bot Runners communicate to the IQ Bot cluster through the load balancer.
- The server message block (SMB) file share and the Microsoft SQL Server store data from the IQ Bot cluster.
- Microsoft SQL Server uses redundancy through active-standby replication syncing to the clustered Microsoft SQL Server. The primary server actively replicates data to the secondary (or standby) server.

#### 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 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 node (active) and secondary node (standby) 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 node.
- 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 (standby) servers that host replicated copies of the services and databases.
- Replication—The secondary (standby) 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 (standby) 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 (standby) node—The machine that is designated as the target in the event of a failover. The secondary node is a passive/standby duplicate of the primary node.
- Server—The machine in the cluster installed with the server operating system.
- Resource version control (VCS or SVN)

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.

## Graceful degradation

Certain dependencies of Automation Anywhere do not require full High Availability (HA) to continue to successfully deploy and run bots. Some dependencies can operate gracefully on a degraded primary node.

The listed Automation Anywhere dependencies continue to function, in a limited capacity if their primary node service is degraded. These include:

### PostgreSQL server

PostgreSQL is used to store dashboard metadata. If PostgreSQL fails, dashboard graphs are not available until PostgreSQL service is restored.

### Subversion (SVN) server

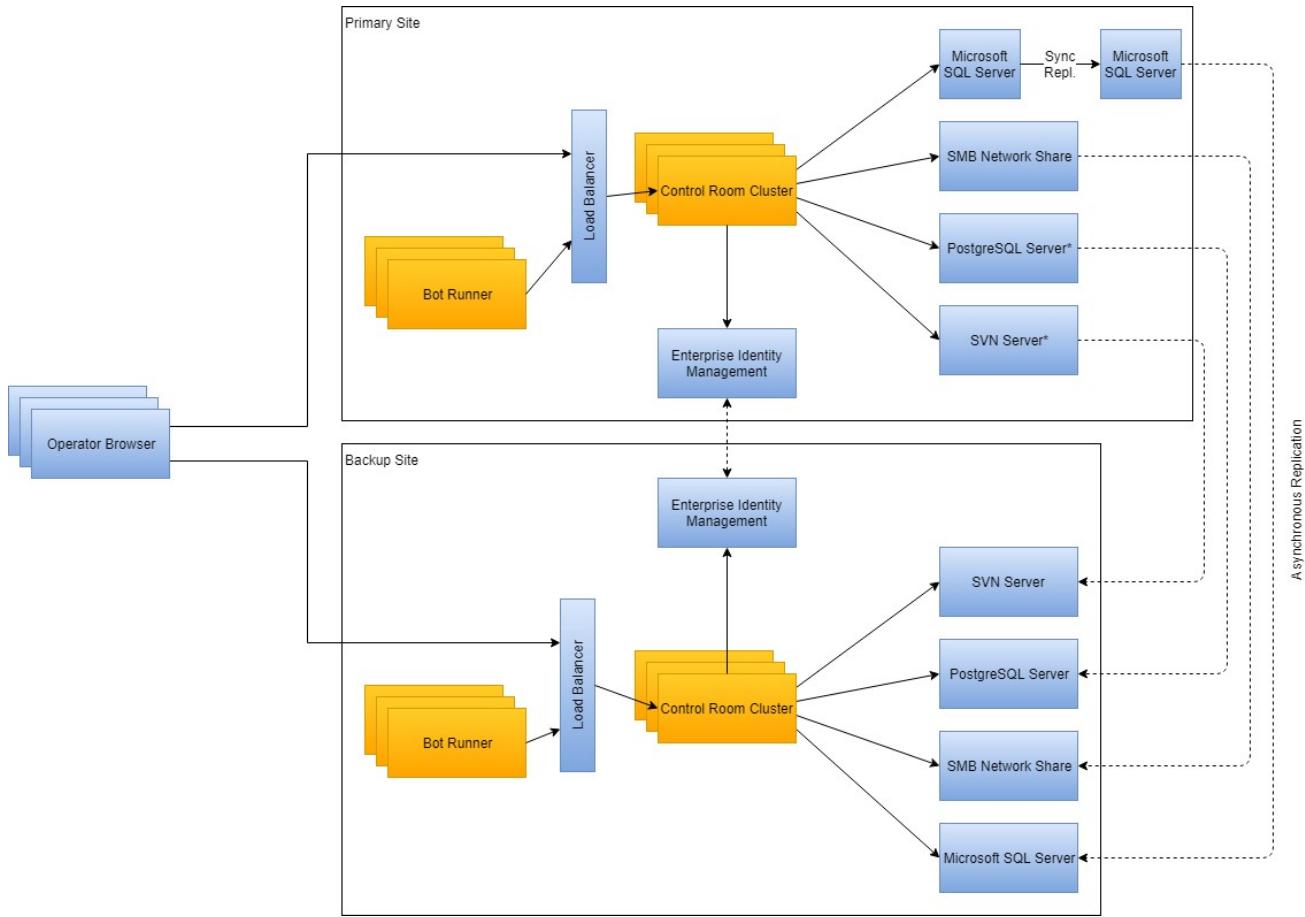
Subversion (SVN) is optionally used to store previous versions of a bot. If SVN is unavailable you cannot change the current production version of bots.

The current production version of all bots continue to be available even if SVN is unavailable.

## Disaster Recovery deployment model

The Disaster Recovery (DR) deployment model uses high availability (HA) clusters distributed over a geographic area.

Disaster Recovery (DR) is a method where the two High Availability (HA) data center configurations are separated geographically. The extra benefit here from a single location HA configuration, is in the event of a localized disaster, the physically removed data center can resume functions with minimum downtime.



In this example, all the servers have HA redundancy. Every data center component, including the PostgreSQL server and Subversion (SVN) server, that don't necessarily require HA redundancy. See [Graceful Degradation](#) for bot support if either of these fail.

For disaster recovery in Automation Anywhere environment.

- Deploy a second Enterprise Control Room HA cluster in an additional datacenter that is in a separate geographic location.
- In the event of a primary site failure, perform the disaster recovery manually. See the [Disaster recovery failover steps overview](#).

Note: When a failover to a backup site occurs, very recent changes made on the primary site might be lost.

Pros

- Provides business continuity when faced with datacenter outage or loss.

Cons

- Increased operational burden.

## DR configuration requirements

When you configure your Disaster Recovery enabled data centers for Automation Anywhere, ensure the listed conditions are met.

## Disaster Recovery configuration requirements

- Asynchronous replication—Configure asynchronous, rather than synchronous replication, between DR sites for all supporting services. This ensures off-site replication does not impact performance of the primary site.
- AD domain—Ensure the same Active Directory domain is available to both the primary and backup sites.
- Site domains—Ensure the backup site Enterprise Control Room and device machines are members of the same domain as the primary site Enterprise Control Room and machines.
- Licenses—Assign floating licenses for users, so that they can log into devices on the backup site.
- Backup site services—Shutdown the Enterprise Control Room services at the backup site until they are needed.
- Site configurations—Ensure the machines at the primary site and backup site have the same specification and configuration. This includes the Enterprise Control Room, Bot Runners, associated devices, and login credentials. This is required to ensure equal level of service during an outage.

Note: Schedules are stored in UTC and therefore run at the same time regardless of the physical location or time zone settings of the server.

- Activation utility—Run the Automation Anywhere bot Activation utility on each of the Bot Runners on the DR backup site.
- web.config file—On the DR secondary (backup) site, add configuration parameters to the Enterprise Control Room configuration file, `web.config`. Use the parameters to designate the Enterprise Control Room for the DR backup site.
- Version control—in the event of a disaster, disable the version control system (VCS) on both DR sites, the primary (production) site and secondary (backup) site.

## Additional Considerations

- Ensure schedules, once created, are stored in the database in UTC format. This ensures the schedules run as specified in the production environment.
- Ensure the recovery site Bot Runners have exact same configurations as the production site Bot Runners they are mapped to.
- Enable user access rights on the folder where the utility runs. Verify the configuration file – `ClientConfiguration.json` is created in the application path by referring to its time stamp.
- Ensure log and .dat files are present in `C:\Users\Public\Documents\Automation Anywhere Client Files`.

## Database Replication Details

The database replication configuration for disaster recovery is an extension of the high availability configuration. This configuration requires the use of Always On availability groups.

- Configure the primary site replica in Synchronous-Commit mode.

- Configure the recovery site replica in Asynchronous-Commit mode. Asynchronous-Commit mode ensures that the latency and reliability of the inter-datacenter does not impact the performance and availability of the primary site.
- Do not configure the recovery site replica to offer any database services until a recovery failover is triggered.

## Failure mode

With asynchronous replication there is the possibility that a transaction that occurs on the primary site might not reach the recovery site replica before the failure occurs.

Note: This possibility of loosing the most recent transactions applies to all DR automated application solutions using asynchronous replication, not just Automation Anywhere solution.

Deployment requires strict consistency between distant geographical locations. Synchronous-Commit configured between replicas with significant latency has a detrimental effect on all Enterprise Control Room operations.

To prevent work items being processed twice when a failure occurs, some work items awaiting delivery to a device are placed into an error state. This ensures they can be manually reviewed and marked as ready to be processed or complete as appropriate.

## Disaster Recovery preparation

Describe the settings and configuration required to ensure recovery in the event of a failed site.

Prior to installing Automation Anywhere, prepare your Disaster Recovery sites.

### Deploy bots

Deploy Bot task and reference files according to your data center administrator approved local procedures for file and data transfers. Typically, these are deployed to production and standby recovery site in parallel.

### Hardware failure protection

Deploy multiple Web servers locally on each DR site. Use an active-active method to assist with load balancing and protect against local hardware failures.

### Data corruption protection

#### Backups

Perform regular on-site full and daily backups of database server, the Enterprise Control Room repository, configuration and task files.

#### DR sites

Apply the same storage configuration on both the primary and secondary DR sites. Apply replication methods to update the secondary DR site from the primary DR site. Example content describes using the Windows feature, Distributed File System (DFS).

### Environmental disaster protection

#### Geographic separation

Protect against a geographical or environmental disaster, complete regular backups of the secondary DR site.

**Primary site**

The location where the active cluster resides.

**Recovery**

In the event of a disaster, some events could stop part way through execution. Retrieve task level log files and other intermediate files to identify the state of any pending processes. Example content describes using SQL Server 2012 AlwaysOn Availability Groups.

The process of shifting the production activities from a failed primary site to the secondary backup site. This applies to DR sites, where recovery is from one site to another.

**Recovery site**

The secondary (redundant) site, that is geographically separated from the primary DR site. This secondary site is a passive/standby replication of the primary site. It is designated as the target location in the event of a disaster.

## Disaster recovery failover steps overview

Overview of failover steps for Automation Anywhere recovery after a disaster.

## Prerequisites

Complete the disaster recovery deployment on two geographically separated sites, where one site is primary (active) and the other is a backup (passive/standby) site. Disaster recovery is performed on remote backup sites.

The procedure is identical regardless of whether switching over from primary to secondary (recovery), or secondary to primary.

If the failed Enterprise Control Room nodes are still available:

## Procedure

1. Shut off all Enterprise Control Room services at the primary site.
2. Failover all Enterprise Control Room-related databases using the database tools.
3. Failover your Server Message Block (SMB) share using the appropriate tools to make the recovery site SMB file share writable.
4. Start Enterprise Control Room services at the recovery site.
5. Wait until the Enterprise Control Room web interface is available.
6. If operating Credential Vault in manual mode, supply the master key.
7. Login to the Enterprise Control Room web interface as an administrator.
8. For each of the recovery site Bot Runners:
  - a) Log in to the Windows console.
  - b) Launch the Automation Anywhere Enterprise client service.
  - c) Enter the appropriate Enterprise Control Room credentials for the Bot Runner.
9. Confirm bots are executing as expected by examining activity and the audit log in the Enterprise Control Room web interface.
10. After the recovery site is operating as the primary site, configure a replacement secondary site. Using the database tools, set replication from the recovery primary site to the replacement secondary site.

# Failover to a DR recovery site

Update the database and login to the Bot Runners on the recovery (DR secondary) site. Verify the secondary site Enterprise Control Room is running with the production (primary) site Bot Runner data.

When properly configured, replication ensures the DR secondary site Enterprise Control Room has production Bot Runner data. In the event of a disaster:

- Update the DR secondary site Enterprise Control Room database with DR primary site Bot Runner data.
- Login the Enterprise client, with its associated Bot Runners, to the backup site Enterprise Control Room.
- Verify recovery is successful.

To update the DR secondary site Bot Runner database:

## Procedure

1. Use the database query listed below to update the Enterprise Control Room database.

This database query uses the Bot Runner data mapping file, created in [Control Room Shared Data & Services sample](#), as an input. Login to Microsoft SQL Server Management Studio.

- a) Open New Query and paste following script.

```
/* Creating temporary table to hold mapping values*/
create table
#ProdToCOBClientMapping(Id int,
HostName nvarchar(100),
ApplicationPath nvarchar(255),
IPAddress nvarchar(40),
FQDN nvarchar(255),
COBHostName nvarchar(100),
COBApplicationPath nvarchar(255),
COBIPAddress nvarchar(40),
COBFQDN nvarchar(255))

/* Load table from mapping file */
BULK INSERT
#ProdToCOBClientMapping FROM 'Mapping Filepath goes here'WITH
(
FIELDTERMINATOR =',',
ROWTERMINATOR ='`n',
FIRSTROW = 2
)
```

```

/* Verify proper mapping has been done*/
Select * From #ProdToCOBClientMapping

/* Update Client table as per mapping. */
UPDATE desClient SET HostName=srcClient.COHostName,
FQDN=srcClient.COBFQDN,
ApplicationPath = srcClient.COBAplicationPath,
IPAddress = srcClient.COBIpAddress
FROM #ProdToCOBClientMapping srcClient INNER JOIN
[DatabaseName].[dbo].[Clients] as desClient ON desClient.Id=srcClient.
Id

/*Drop temp table */
drop table #ProdToCOBClientMapping

/* Verify table values */
SELECT * FROM [DatabaseName].[dbo].[Clients]

```

- b) Update the Database name and Mapping file path.
  - c) After the database changes are done, start the DR secondary (recovery) site Enterprise Control Room services.
2. Start each Bot Runner.
- a) Verify your Window Login Credentials in the Enterprise client. Select Tools > Options > Login Settings.
  - b) Launch Automation Anywhere.
  - c) Enter your credentials to login to the Enterprise Control Room.
  - d) Start every Bot Runner.
3. Verify your DR environment is up and running on the recovery site.  
Verify the schedules, ensure that the bots, and Bot Runners are functioning successfully. See the DR recovery site audit logs.

## Next steps

## Re-establish a duplicate DR site

After a secondary (backup) site is recovered as the primary (production) site, establish a new secondary DR site.

## Prerequisites

The recovery site is up and running as the new production site.

The process of returning activity to a primary (active) production site, plus secondary (backup) site depends on the state of the original primary site.

## Procedure

- If the old production environment becomes available again, complete the following to switch back to the original DR primary site.
  1. Restore/replicate the DR database and file system to the original production database and file system respectively.  
If the data added in DR environment is not needed in production environment, skip to Step 3.
  2. If any new users were added to DR recovery site environment and they logged into Enterprise Control Room and Bot Runners, reverse COB procedures need to be followed for those users.  
For example:  
Note: This step is only applicable for new users that were added in during the disaster. If no new users were added in DR environment, skip this step.
    - Prepare mapping of corresponding DR Bot Runners with production Bot Runners.
    - Run the database query in the recovery production environment database for those Bot Runners.
    - Run the Activation utility on new Bot Runners in recovery production environment.
    - Login to recovery production Enterprise Control Room with new added production Bot Runners, from the Enterprise client.
  3. Bring up the new DR primary (production) Enterprise Control Room.
  4. Verify new DR primary (production) environment is working, as expected.
  5. Stop the DR Enterprise Control Room services on the DR recovery site.
  6. Establish the replication between the new DR primary (production) and DR secondary (standby) Enterprise Control Room (DB and NAS).
- If the old DR primary production environment is rendered completely unusable due to the disaster, re-establish a new secondary (standby) DR site. Complete the recovery DR steps to re-establish primary and secondary DR sites.
  1. Restore/replicate the database and file system data from DR environment to the new production environment.
  2. Generate the mapping files containing host related information of DR Bot Runners and new production Bot Runners.
  3. Run the Activation utility on each of the new production Bot Runners.
  4. Execute the database script on new production Enterprise Control Room database.  
Note: The `web.config` configuration flag is strictly enforced.

## Next steps

No additional steps are required. The DR primary and secondary sites are restored.

- The bot Activation utility does not need to be run again. Activation occurs when Automation Anywhere is first deployed to the DR cluster sites only.
- For any subsequent disasters, only the database query needs to be run on DR secondary (standby) Enterprise Control Room database. This is required because the replication between DR primary (production) and DR secondary (standby) overwrites DR secondary site Bot Runner data in DR secondary site database with DR primary (production) Bot Runner data.

- 
- Similarly, the mapping between DR primary and DR secondary Bot Runner is established. Use the same mapping for all subsequent disasters or mock drills.

## Enterprise Control Room operations overview

Provides overview of control room operations.

From the Enterprise Control Room, there are several configuration options for managing and monitoring. This section provides some general guidelines for setting Enterprise Control Room operations, such as: data retention, logging, monitoring and alerts, database maintenance planning.

- [Managing logs](#)

Gather your Automation Anywhere bot logging data in one central location for better and more efficient consumption.

- [Monitoring and alerts](#)

For monitoring and alerting, use built-in Windows functionality.

- [Database maintenance plan](#)

The following database backup strategy is strongly recommended.

- [Database backup and recovery for Enterprise Control Room](#)

Create a full database backup of the Automation Anywhere database and the file system where you store the configuration files and bots.

- [Identity management requirements](#)

Identity is verified at several stages of both Automation Anywhere Enterprise deployment and bot creation and use. This includes credentials, authentication, licensing, roles, and permissions.

## Managing logs

Gather your Automation Anywhere bot logging data in one central location for better and more efficient consumption.

Logging data is generated throughout the Automation Anywhere product. For logging to be more useful, we recommend that you consolidate your logs into one central machine or area.

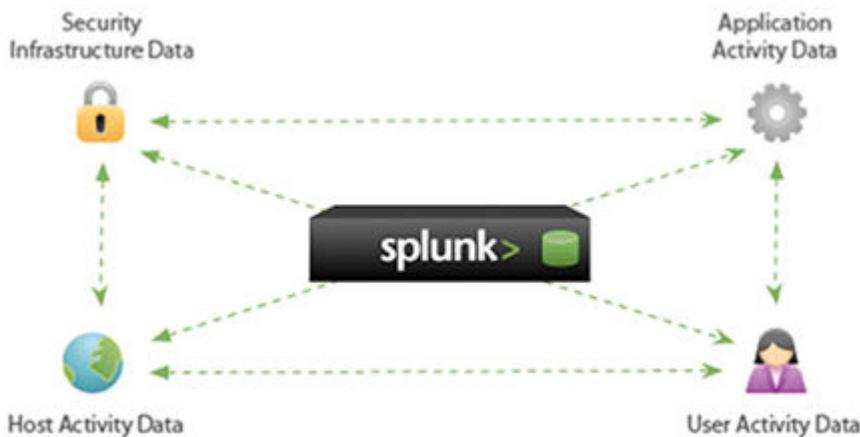
### Windows built-In logging strategy

Windows has a built-in form of centralized logging. To setup a single machine that pulls all logging data from other machines into a single location using subscriptions:

1. Open Event Viewer on the machine to be used for central logging.
2. Subscribe to Logging Events from each of the other source computers.

### Splunk strategy

To be practical and useful, logging methods need to: collect logging events across all systems and apps, provide a holistic view of the entire environment, and display the collected logs in a single area or tool. Tools, such as Splunk, aggregate various types of logs from various sources into one central location.



Splunk is compatible with the Automation Anywhere logging infrastructure, as well as network and operating system (OS) environments, and provides a single holistic view of an entire system. Splunk's light-weight software agent, Universal Forwarder, can be installed on most operating systems and networking environment. The Universal Forwarders monitor logs as they are generated and forward them to the Splunk Indexing Server, all in real-time. Splunk deployment is both easy and scalable. More importantly, it provides the top level view of the whole enterprise and provides drill-down options into all of your logging data.



## Log event types

There are three event types.

### Infrastructure logging

Network, router, switch, firewall, gateways, etc.

### Systems logging

Windows Event Viewer, Web Server Logs, and machine logs.

### Application logging

- Enterprise Control Room
- Bot Runner
- Bot Creator (Dev Client)
- BotFarm

- Credential Vault
- Bot Insight for analytics

## Log retention

How long you retain collected logs is typically determined by company policy, and typically defined in terms of currently active (hot), accessible backup (warm), and historical records (cold).

### Hot storage

The current, active log files. Stored on the server where they were generated or where they are collected. Keep these files locally, on your servers, for at least a month.

### Warm storage

Corporate-wide backups that are generally available for at least one year. Typically, are moved from warm storage to cold storage after five years.

### Cold storage

Long term archive storage such as the use of magnetic tape that survives the test of time. These are the files that are moved from warm storage, five years after origination date.

## Log rotation

Log rotation is highly recommended where dated log files are archived. This ensures logs are kept a manageable file size in the file system. Recommended rotation is every 24 hours, that is, archive the log file every 24 hours. If your system generates a lot of log data, adjust the frequency of the log rotation.

Alternatively, choose a combination method based on your environment. For example:

### Log Rotation by Time

Create a single new log file per 24 hours.

### Log Rotation by Size

Create new log file based on the size of the log file.

### Log Rotation by Bot

Some combination of both to limit size and time per log file.

- [Audit Logs for authorized user activity](#)

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.

- [Activity logging for bot activity](#)

For every Bot Creator and Bot Runner, Automation Anywhere performs a comprehensive activity logging for bots, workflows, reports etc.

## Audit Logs for authorized user activity

The Automation Anywhere Enterprise platform provides a comprehensive and centralized audit logging of all automation activities to authorized users. Role-based access control to Audit Log is managed through the Enterprise Control Room. More than 60 audit actions are logged.

All valid and invalid attempts of actions are logged. Events are logged by the following factors:

### Doer of the action

For example, a username.

Source of the action

For example, Bot Runner or Enterprise Control Room

Type of event

The description of the event.

When the event occurred

For example, the date and the time of the event.

Where the event occurred

The device.

Outcome of the event

Description and status of the event.

Some key audit actions include the following:

- Log in and log out of the centralized Enterprise Control Room.
- Create, update, and delete Users.
- Activate and deactivate the Enterprise Control Room users.
- Any change of password for any user
- Create, update, and delete roles (helps in tracking changes to security policy, change in user access privileges)
- Create, update, and delete schedules
- Connection to the Credential Vault
- Create, update, and delete credentials
- Set the Production-ready version of the bots.
- 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, version control, and other settings
- Enable and disable secure recording.
- Change a license.

Create Bot Runner instance on BotFarm, release virtual machine, terminate virtual machine.

The Enterprise Control Room can be configured to export audit logs to an external log consolidation and reduction server via the Syslog protocol. This enables integration with Security Event Incident Management (SEIM) systems, for example, Splunk or LogRhythm. Configure the Syslog integration from the Settings -> Syslog page in the Enterprise Control Room.

Syslog integration uses either UDP or TCP, and is configured to use TLS encryption between the Enterprise Control Room and the remote Syslog server.

## RBAC on audit log

Audit is automated for all privileged and nonprivileged roles to conform to best practices as defined in NIST AC-6. Access is view-only based on a deny-all and allow by exception based on roles and domains as defined in the Audit Section 7 addressing Audit and Accountability (NIST AU 1 through 15) and as required by NIST AC-2 Automated System Account Management.

If a role does not have permission to view Audit Logs, the Audit Trail tab is not visible to all members of those roles. Audit automatically captures all events related to creation, modification, enable, disable, user removals, bots, Bot Creators, and Bot Runners.

## Enterprise Control Room Bot Creator and Bot Runner activity logging

For every Bot Creator and Bot Runner, the Automation Anywhere Enterprise platform does comprehensive activity logging for bots, workflows, and reports.

Some of the key activities logged include the following:

- Task creation, update, deletion (task is a type of bot).
- Task run
- Workflow creation, update, deletion
- Workflow run
- Report creation, update, deletion
- Report run
- Change in bot properties

## Audit of Bot Runner operations

Bot Insight captures additional Bot Runner events for review and analysis of audit records for indications of inappropriate or unusual activity. The Bot Insight logs can be exported for further analysis. Automated dashboards and reports are available and can be customized to identify and alert on anomalous activity. These capabilities conform to best practices as defined in NIST AU-6 Audit Review Analysis and Reporting.

## Audit log nonrepudiation

The logs are protected against an individual (or process acting on behalf of an individual) falsely denying having done authorized actions through read-only privileges, automated event capture, and binds the identity of the user to the actions, in conformance with best practices as defined in NISGT AU-10 Non-repudiation and AU-11 Association of Identities.

## Export audit logs

All Enterprise Control Room and Bot Insight Bot Runner logs are exported to a Security Event Information Management Systems for further analysis to support the organizations incident response efforts in accordance with the NIST AU-6 and IR-5 requirements.

## Activity logging for bot activity

For every Bot Creator and Bot Runner, Automation Anywhere Enterprise performs a comprehensive activity logging for bots, workflows, reports etc.

Some of the key activities logged are:

- Task Creation, Update, Deletion (task is a type of bot)
- Task Run
- Change in properties

Figure 1. Activities logged sample

**System Logs**

Select Log Type : Task Run Start Date : 06/01/2017 End Date : 07/07/2017

Generate Logs

**Task Run Logs**

Sr. No.	Task/Variable Name	Date	Time	Description
69	TE_3270_GetText_AllLine.atmx	06/22/2017	15:34:50	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
70	TE_3270_GetText_AllLine.atmx	06/22/2017	15:35:15	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
71	TE_3270_GetText_AllLine.atmx	06/22/2017	15:36:08	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
72	TE_3270_GetText_AllLine.atmx	06/22/2017	15:36:31	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
73	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:39:44	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
74	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:40:06	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
75	TE_5250_GetText_AllLine.atmx	06/22/2017	15:40:21	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
76	TE_5250_GetText_AllLine.atmx	06/22/2017	15:40:30	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati
77	TE_5250_GetText_AllLine.atmx	06/22/2017	15:41:51	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
78	TE_5250_GetText_AllLine.atmx	06/22/2017	15:42:13	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati
79	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:45:22	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
80	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:45:31	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati

Export to CSV file : D:\rajendra.vijay\My Documents\Automation Anywhere Files\07-07-2017.csv ... e.g. C:\Reports\first.csv Export OK

## Monitoring and alerts

For monitoring and alerting, use built-in Windows functionality.

### Windows built-in performance monitor solution

Use the Windows performance counters to capture vital information such as CPU load, memory, and other resources. Use Nagios for performance monitoring in a network environment.

1. From Windows, open Performance Monitor.
2. Create new data collector set. Then choose a data collector such as CPU, memory, or disk IO.
3. In the Alert Box, specify the email address and SMS to be notified up on a failure.

## Nagios

Nagios is a powerful enterprise-grade hardware, network, and server monitor and alert product that provides an instant awareness of your Automation Anywhere IT infrastructure. There are two parts to consider when it comes to monitoring as a strategy:

- Monitoring
- Alerting

## Monitoring

Objects to monitor for each group include, for example:

### Machines

(machine, VM, devices, etc.) CPU load, memory pressure, disk space, disk IO, processes, and other system metrics. Machines include, for example, Enterprise Control Room, BotFarm, and Bot Runner.

### Network

Protocol, uptime, overload, throughput, ping, latency, DNS.

### Application

bot running time, log peek, scheduling service, database service, web server, load balancing, log truncation.

## Alerting

Nagios can send alerts when critical infrastructure components fail. It can also be configured to notify recovery. There are 3 alerting methods:

### Email

Sends an email to administrator or IT team upon critical/important events.

### SMS

Sends a text message upon critical events.

### Custom script

Alerting logic can highly be customized based on several properties. For example, an escalation can be setup based on severity, time, etc.

## Database maintenance plan

The following database backup strategy is strongly recommended.

- Weekly—Full database backup.
- Every 3 Days—Differential backups.
- Daily—Incremental backups every 24 hours.
- Hourly—Transaction log backup every hour.

## Database backup and recovery for Enterprise Control Room

Create a full database backup of the Automation Anywhere database and the file system where you store the configuration files and bots.

Important: Verify that your database backups and file system backups are in sync in order to maintain consistency between the DB and the file system for recovery efforts.

Back up the following [installation and configuration](#) files. This includes:

- Bot Creator schedules configuration files
- Auto Login configuration files
- Client configuration files

- Database configuration files

For Automation Anywhere database backup and recovery processes, follow your standard best practices.

## Backup and recovery using Windows SQL

When you use SQL for your database:

Configure Windows SQL to integrate with Automation Anywhere. See [Working with SQL Servers](#).

For complete information, see the Windows documentation:

- [Create a Full Database Backup \(SQL Server\)](#)
- [Recovery Models \(SQL Server\)](#)

Alternatively, manage the backup and recovery processes based on third party applications such as [SQL Server Management Studio](#). Then automate this process using an Automation Anywhere bot.

## Identity management requirements

Identity is verified at several stages of both Automation Anywhere Enterprise deployment and bot creation and use. This includes credentials, authentication, licensing, roles, and permissions.

- [Default licenses and roles for bot tasks](#)

Review the list of typical tasks, licensing, and roles required to create, run, and manage bots.

### Default licenses and roles for bot tasks

Review the list of typical tasks, licensing, and roles required to create, run, and manage bots.

Function	Task	Licensing	System Defined Role	Notes
Automation Anywhere	Deploy Automation Anywhere components.	Product license for Enterprise Control Room. License key for Enterprise client.	System administrator on the hosting server.	
Automation Anywhere	Install Automation Anywhere components.	Product license for Enterprise Control Room. License key for Enterprise client.	System administrator on the hosting server.	

Function	Task	Licensing	System Defined Role	Notes
Bots	Automate bots in Enterprise client.	Bot Creator (Development)	All Enterprise Control Roomusers	License issued as number of users.
Bots	Create bot in Enterprise client	Bot Creator (Development)	All Enterprise Control Roomusers	License issued as number of users.
Bots	Run bots. From a Enterprise client, locally.	Attended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Bots	Run bots. From a Enterprise client, locally.  From a Enterprise Control Room: <ul style="list-style-type: none"><li>• Production deployment,</li><li>• Using centralized scheduling, or</li><li>• Using APIs</li></ul>	Unattended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Bots	Run bots from BotFarm.	BotFarm (Runtime)	AAE_BotFarm Agent	License issued as a number of hours used by all runtime clients within BotFarm for executing a bot.
BotFarm	Administer BotFarm functions.	BotFarm (Runtime)	AAE_BotFarm Admin	License issued as a number of hours used by all runtime clients within BotFarm for executing a bot.
BotFarm	Manage BotFarm.	BotFarm (Runtime)	AAE_BotFarm Agent	License issued as a number of hours used by all

Function	Task	Licensing	System Defined Role	Notes
				runtime clients within BotFarm for executing a bot.
BotFarm	View BotFarm.	BotFarm (Runtime)	AAE_BotFarm Agent	License issued as a number of hours used by all runtime clients within BotFarm for executing a bot.
Bot Insight	Analyze bot data in Bot Insight from Enterprise client.  Access data from Enterprise client: <ul style="list-style-type: none"><li>• system generated dashboards</li><li>• user-created dashboards</li></ul>	Bot Insight	AAE_Bot Insight Consumer role or AAE_Bot Insight Expert role or AAE_Bot Insight Admin	This license for all business analytic roles.  Limited access to Enterprise Control Room features when only Bot Insight license is installed.
Bot Insight	Search for CoE dashboards.	Bot Insight	AAE_Bot Insight Admin or AAE_Bot Insight CoE Admin	This license for all business analytic roles.  Limited access to Bot Insight CoE dashboards.
Bot Insight	Analyze bot data in Bot Insight from Enterprise Control Room  Access data from Enterprise Control Room: <ul style="list-style-type: none"><li>• production dashboards</li></ul>	Bot Insight	AAE_Bot Insight Consumer role or AAE_Bot Insight Expert role or AAE_Bot Insight Admin	This license for all business analytic roles.  Limited access to Enterprise Control Room features when only Bot Insight license is installed.

Function	Task	Licensing	System Defined Role	Notes
	<ul style="list-style-type: none"> <li>• system generated dashboards</li> <li>• user-created dashboards</li> </ul>			
Bot Insight	Enable Business Analytics in Enterprise Control Room or Enterprise client	Bot Insight	AAE_Bot Insight Expert role or AAE_Bot Insight Admin	This license for all business analytic roles.  License counts distributed between Bot Insight Admin, Bot Insight Consumer, or Bot Insight Expert.
Bot Insight	Enable Business Analytics through API.	Bot Insight	AAE_Bot Insight Expert role or AAE_Bot Insight Admin	This license for all business analytic roles.  API count is measured in number of rows that the API fetches from the Bot Insight database.
Bot Insight	Manage data in Bot Insight.	Bot Insight	AAE_Bot Insight Expert or AAE_Bot Insight Admin	This license for all business analytic roles.  Limited access to Enterprise Control Room features with only Bot Insight license is installed.
Bot Insight	Prepare bots for Bot Insight analysis in Enterprise client.	Bot Creator (Development) and	AAE_Bot Insight Expert role or	The Bot Insight license for all business analytic roles.

Function	Task	Licensing	System Defined Role	Notes
		Bot Insight	AAE_Bot Insight Admin	
Bot Insight	View data in Bot Insight.	Bot Insight	AAE_Bot Insight Admin or AAE_Bot Insight Consumer	This license for all business analytic roles.  Limited access to Enterprise Control Room features with only Bot Insight license is installed.  Data logged by Enterprise Control Room about a task during Production runs.
Bot Insight	View logged data using Bot Insight RESTful APIs.	Bot Insight	AAE_Bot Insight Admin	This license for all business analytic roles.  Limited access to Enterprise Control Room features when only Bot Insight license is installed.  Data logged by Enterprise Control Room about a task during Production runs.  API count is measured in number of rows that the API fetches from the Bot Insight database.

Function	Task	Licensing	System Defined Role	Notes
Bot Runner	Run bots. From a Enterprise client, locally.	Attended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Bot Runner	API-based Bot Runner deployment.	Unattended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Bot Runner	Centralize scheduling Bot Runner in Enterprise Control Room	Unattended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Bot Runner	Deploy Bot Runner in Enterprise Control Room	Unattended Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Credentials	Change credential owners	Product license	AAE_Locker Admin	License issued as number of users.  Applied on Enterprise Control Room.  This role's permission is not applicable to Enterprise Control Room Admin role.
Credentials	Edit credential permissions	Product license	AAE_Locker Admin	License issued as number of users.  Applied on Enterprise Control Room.  This role's permission is not applicable to Enterprise Control Room Admin role.

Function	Task	Licensing	System Defined Role	Notes
Credentials	Manage my credentials	Product license	All Enterprise Control Roomusers	License issued as number of users. Applied on Enterprise Control Room.
Credential lockers	Manage credential lockers (see Lockers)	Product license	AAE_Locker Admin	License issued as number of users. Applied on Enterprise Control Room. This role's permission does not apply to Enterprise Control Room Admin role.
Credential Vault	Manage credential vaults	Product license	AAE_Locker Admin	License issued as number of users. Applied on Enterprise Control Room. This role's permission does not apply to Enterprise Control Room Admin role.
Credentials	Remove credentials	Product license	AAE_Locker Admin	License issued as number of users. Applied on Enterprise Control Room. This role's permission is not applicable to Enterprise Control Room Admin role.

Function	Task	Licensing	System Defined Role	Notes
Credentials	View all credentials	Product license	AAE_Locker Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p> <p>This role's permission is not applicable to Enterprise Control Room Admin role.</p>
Dashboards	Bookmark dashboards	Bot Insight	AAE_Bot Insight Expert or AAE_Bot Insight Consumer or AAE_Bot Insight Admin	<p>This license applies to all business analytic roles.</p>
Dashboards	Delete user-created dashboards	Bot Insight	AAE_Bot Insight Expert or AAE_Bot Insight Admin	<p>This license applies to all business analytic roles.</p>
Dashboards	Modify user-created dashboards.	Bot Insight	AAE_Bot Insight Admin role	<p>This license applies to all business analytic roles.</p>
Dashboards	Publish user-created dashboards.	Bot Insight	AAE_Bot Insight Admin role	<p>This license applies to all business analytic roles.</p>
Dashboards	Save As system-generated dashboards. Prepare for modify.	Bot Insight	AAE_Bot Insight Admin role	<p>This license applies to all business analytic roles.</p>

Function	Task	Licensing	System Defined Role	Notes
Dashboards	View Dashboard	Product license	All Enterprise Control Roomusers	License issued as number of users. Applied on Enterprise Control Room.
Databases	Manage database maintenance plan	Product license	Administrator user for the Enterprise Control Room data center	License issued as number of users. Applied on Enterprise Control Room.
Databases	Manage database backup and recovery	Product license	Administrator user for the Enterprise Control Room data center	License issued as number of users. Applied on Enterprise Control Room.
Enterprise client	Access Bot Creator	Bot Creator (Development)	All Enterprise Control Roomusers	License issued as number of users.
Enterprise client	Access Bot Runner	Bot Runner (Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Enterprise client	View bots	Product license	All Enterprise Control Roomusers	License issued as number of users. Applied on Enterprise Control Room.
Enterprise Control Room	Access to all Enterprise Control Room features	Product license	AAE_Admin	License issued as number of users. Applied on Enterprise Control Room.
Enterprise Control Room	Administer Enterprise Control Room settings	Product license	AAE_Admin	License issued as number of users.

Function	Task	Licensing	System Defined Role	Notes
				Applied on Enterprise Control Room.  This is the only role that has permissions to change these settings.
Enterprise Control Room	View Enterprise Control Room	Product license	All Enterprise Control Roomusers	License issued as number of users.  Applied on Enterprise Control Room.
Files and folders	Access all folders and files.	Product license	AAE_Admin	License issued as number of users.  Applied on Enterprise Control Room.
Files and folders	Access my folders and files.	Product license	All Enterprise Control Roomusers	License issued as number of users.  Applied on Enterprise Control Room.
IQ Bot	Access the IQ Bot console.	IQ Bot	AAE_IQ Bot Services	Limited access to Enterprise Control Room features.
IQ Bot	Run IQ Bots within parent TaskBots.	IQ Bot and Unattended Bot Runner (Runtime) or Attended Bot Runner (Runtime)	All Enterprise Control Roomusers	The IQ Bot licensed number of users distributed between Unattended and Attended Bot Runners.

Function	Task	Licensing	System Defined Role	Notes
Lockers	Administer Lockers	Product license	AAE_Locker Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p> <p>This role's permission is not applicable to Enterprise Control Room Admin role.</p>
Lockers	Delete lockers	Product license	AAE_Locker Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p> <p>This role's permission is not applicable to Enterprise Control Room Admin role.</p>
Lockers	Manage my lockers	Product license	All Enterprise Control Roomusers	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p>
Lockers	Manage lockers	Product license	AAE_Locker Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p> <p>This role's permission is not applicable to Enterprise Control Room Admin role.</p>

Function	Task	Licensing	System Defined Role	Notes
Lockers	View all lockers	Product license	AAE_Locker Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p> <p>This role's permission is not applicable to Enterprise Control Room Admin role.</p>
MetaBot Designer	Access MetaBot Designer from: Enterprise client as a Bot Creator user.	Bot Creator (Development)	AAE_MetaBot Designer	<p>Users do not have permission to see any bots or supporting files.</p> <p>Bot Creator users migrated from Enterprise Control Room 11.1 or older, who had access to MetaBot Designer, continue to have access to MetaBot Designer.</p>
Monitoring and alerts	Manage monitoring and alerts	Product license	Administrator user on the Enterprise Control Room	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p>
Pools	Administer all device pools	Product license	AAE_Pool Admin	<p>License issued as number of users.</p> <p>Applied on Enterprise Control Room.</p>

Function	Task	Licensing	System Defined Role	Notes
Pools	Manage all device pools	Product license	AAE_Pool Admin	License issued as number of users.  Applied on Enterprise Control Room.  Users with AAE_Pool Admin do not have permission to see any bots or supporting files.
Pools	View all device pools	Product license	AAE_Pool Admin	License issued as number of users.  Applied on Enterprise Control Room.  Users with AAE_Pool Admin do not have permission to see any bots or supporting files.
Queues	Manage all schedule queues	Product license	AAE_Queue Admin	License issued as number of users.  Applied on Enterprise Control Room.
Queues	Manage my schedule queues	Product license	All Enterprise Control Room users	License issued as number of users.  Applied on Enterprise Control Room.
Queues	View all schedule queues	Product license	AAE_Queue Admin	License issued as number of users.  Applied on Enterprise Control Room.

Function	Task	Licensing	System Defined Role	Notes
Queues	View my schedule queues	Product license	All Enterprise Control Roomusers	License issued as number of users. Applied on Enterprise Control Room.
Schedules	Set attended local schedules in Enterprise client	Attended Bot Runner(Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Schedules	Set unattended local schedules in Enterprise client	Unattended Bot Runner(Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Schedules	Set attended triggers for time or event based bots in Enterprise client.	Attended Bot Runner(Runtime)	All Enterprise Control Roomusers	License issued as number of users.
Schedules	Set unattended triggers for time or event based bots in Enterprise client.	Unattended Bot Runner(Runtime)	All Enterprise Control Roomusers	License issued as number of users.
TaskBot	Download TaskBots in the My Tasks folder.	Product license	AAE_Basic	License issued as number of users. Applied on Enterprise Control Room. Role has limited access to other features.
TaskBot	Upload TaskBots in the My Tasks folder.	Product license	AAE_Basic	License issued as number of users. Applied on Enterprise Control Room. Role has limited access to other features.
Trial licenses	Trial license is shipped with	Trial License	Apply roles as needed.	When <a href="#">Trial license</a> expired, contact System

Function	Task	Licensing	System Defined Role	Notes
	validity of 30 days.			Administrator or Automation Anywhere Sales to purchase a new license.
Users	Create Admin users	Product license	AAE_Admin	License issued as number of users. Applied on Enterprise Control Room.
Users	Manage users and logins	Product license	AAE_Admin	License issued as number of users. Applied on Enterprise Control Room. Administrator user on the Enterprise Control Room.
Validator	Access the Validator.	IQ Bots	AAE_IQ Bot Validator	Limited access to Enterprise Control Room features with only an IQ Bot license.

Production dashboards can be either the system-generated dashboards or user-created dashboards that are uploaded to the Enterprise Control Room.

## Bot design guidelines and standards

Advanced guide to developing bots and providing guidelines and standards for bot development.

This topic provides an introduction to common bot design guidelines and standards. Avoiding these common mistakes and including these processes and considerations in your bot design standards, creates bots that are clean, easier to read, test, and maintain, and are stable. Most of the guidelines improve either efficient use of production resources or reduce maintenance time and errors.

### Bot design considerations

- Best practice

Generally, keep a Automation Anywhere TaskBots to less than 500 lines, preferably only a few hundred lines.

- Break out processes: Giant business processes > giant bots

The key to the successful bot development of a business process is a well-defined, well-thought-out strategy. If a business process is so large that it requires more than 8 or 10 sub-tasks, or any one task contains thousands of lines, then reconsider the bot approach to the process.

Evaluate your business processes. Use this understanding when creating your associated bot approach.

- Can the business process itself be simplified? Identify any redundant or circular steps.
- Identify logical, contained breaks or splits in your processes.
- Can parts of the business process be split into separate bots?
- Reduce repetition

Don't repeat yourself principle (DRY) and Rule of three, both basically mean, reduce repetition.

Create a loop that contains a single call, rather than calling a same small number of steps separately.

Use variables where appropriate.

Break out repeated bits of logic or commands into sub-tasks. If a set of commands is repeated multiple times across a task, it makes maintenance difficult. If it needs an update, all instances need to be located and correctly updated.

- Plan for maintenance

When a rule is encoded in a replicated set of tasks changes, whoever maintains the code has to change it in all places correctly. This process is error-prone and often leads to problems.

Contain the set of command and rules in one location. If the set of commands or rules exist in only one place, then they can be easily changed there.

- Test-driven design

Smaller tasks can easily be tested alone, in a unit-test fashion. Tasks without dependencies can use automated testing. Tasks split into sub-tasks by separate functions, even tasks that are performed once at the beginning of a sequence, increase maintainability and ease of testing.

- Network fault handling

When creating bots that rely on network connectivity, ensure to include steps for gracefully handling networking delays. For example, when a bot requires a web page response, such as opening a Save As dialog, and the network has an outage. What do you want the bot to do, try again or exit out with a message?

## Sub-task overview

A sub-task is called by the parent task that needs the service. They are also referred to as helper tasks or utility tasks, since their only purpose is to assist the calling task.

Tip:

Sub-tasks should be small and focused, having only a single or only a few responsibilities.

Excel sessions, CSV/text file sessions and browser sessions (web recorder) cannot be shared across separate tasks. So sub-tasks must be included in such a way so they do not break these sessions.

Benefits include:

- The production task code is shorter.
- When changes are needed, only the subtask needs to be located, analyzed, and edited. This makes bot maintenance easier.
- Make sub-tasks as reusable as possible.

If factored out properly, sub-tasks can be made to be reusable, making them even more productive. The subtask can be called by any number of other tasks, including other bots.

- Make sub-tasks as standalone as possible.

Sub-tasks do not stand entirely alone. They should not run on their own. They should be called by a parent task. But remove as many other task dependencies where possible.

## Sub-task considerations

- Single responsibility principle

Apply one task or responsibility to each sub-task.

Splitting large tasks into sub-tasks is useful, but pulling all similarly related small tasks into one sub-task is still prone to maintenance errors. Making a change to one small task might affect the other small tasks contained in the larger sub-task.

Better to make multiple sub-tasks, each with a single, specific purpose. For example, if you have a large sub-task that handles printing a PDF, moving a file, and saving a file, split these sub-tasks out. Give each sub-task its own responsibility – One for print to a PDF, another for moving the files, and a third for saving files.

- Decoupling dependencies

When possible, define sub-tasks so they do not require the calling task to provide information. The required information is a dependency. Identify the dependency and include it in the sub-task. This makes the sub-tasks stand-alone, enables unit-testing, and allows it to be called by other tasks without adding dependencies.

For example, if a login sub-tasks can only be called if the calling task provides a URL, it has dependency. All parent tasks calling the sub-task must provide a URL. If the URL changes, more than

one task must be changed. If the login sub-task includes the URL, it is decoupled from the parent task. If the URL changes, only the one sub-task needs an update.

- Bi-directional dependencies

If sub-tasks cannot change without calling tasks changing, they are dependent and not truly decoupled. If calling tasks cannot change without all sub-tasks changing, they are not truly decoupled, and have bi-directional dependencies. These interwoven dependencies make unit-testing nearly impossible.

- Avoid too many sub-tasks

While all of the above principles are excellent principles for designing bots, too many sub-tasks also becomes prone to maintenance challenges and confusion. The number of sub-tasks needs to be a manageable amount.

A bot that has 30 sub-tasks, or would be thousands and thousands of lines without using sub-tasks, probably indicates a business process that is too large for one bot. Break down large processes into pieces, then encapsulate each of the separate pieces into their own bots.

## Sub-task example

For example, suppose a bot has the need print a notepad document as a PDF file. The task might look like the following:

```


Keystrokes: [CTRL DOWN]p[CTRL UP] in "$vWindowTitle$"

Delay: (1 sec)

Keystrokes: p in "Print"

Keystrokes: [ALT DOWN]p[ALT UP] in "Print"

Set Text of Text Box in Window: "Pdf995 Save As" Text:"$vTargetFileName$"

Keystrokes: [TAB] in "Pdf995 Save As"

Keystrokes: [TAB] in "Pdf995 Save As"

Keystrokes: [TAB] in "Pdf995 Save As"

Keystrokes: [ENTER] in "Pdf995 Save As"

```

In this example, there is a need to print a file as a PDF document three times. On the example development machine the PDF print driver is called Pdf995.

Recommendations:

- Because there is likelihood that the PDF print driver in production has a different name, investigate if using a variable is practical.
- Because there is the potential for this task to be promoted to production, and possibly repeated multiple times, recommendation is to turn this into a sub-task.

The example seen as a sub-task:

```

1  Comment: =====
2  Comment: This is a helper task designed to print a document in the form of a PDF file.
3  Comment: It is not designed to be run standalone.
4  Comment: =====
5  Comment: === Warn user is this task is being run in standalone mode ===
6  If $vTargetFileName$ Equal To (-) "" Then
7      Message Box: "This task is not designed to be run by itself, it is only designed to be called by another task. Please run the master task. This automation will now stop."
8      Stop The Current Task
9  End If
10 Comment: === ctrl+p to save as PDF ===
11 Variable Operation: false To $vSuccess$
12 Begin Error Handling; Action: Continue; Options: Variable Assignment, Task Status: Fail
13 Keystrokes: [CTRL DOWN]p[CTRL UP] in "$vWindowTitle$"
14 Delay: (1 sec)
15 Keystrokes: p in "Print"
16 Keystrokes: [ALT DOWN]p[ALT UP] in "Print"
17 Set Text of Text Box in Window: "Pdf995 Save As" Text:"$vTargetFileName$"
18 Keystrokes: [TAB] in "Pdf995 Save As"
19 Keystrokes: [TAB] in "Pdf995 Save As"
20 Keystrokes: [TAB] in "Pdf995 Save As"
21 Keystrokes: [ENTER] in "Pdf995 Save As"
22 Delay: (1 sec)
23 Keystrokes: [CTRL DOWN]q[CTRL UP] in "Adobe Reader"
24 Variable Operation: true To $vSuccess$
25 End Error Handling

```

If any changes are required to this specific set of commands, only this helper task needs to be edited, and only this helper task needs to be retested.

- [Testing](#)  
bot tasks should be fully tested.
- [Commenting](#)  
Most bots require changes after they are placed into production. Use comment to help updates and maintenance.
- [Naming Conventions](#)  
Capitalization and spacing styling in names.
- [Defining logs](#)  
When designing logs, make them easy to read and easy to parse.
- [VB Script](#)  
VB script option.
- [Configuration Files](#)  
Use configuration files to separate initial variable values.

## Testing

bot tasks should be fully tested.

A required step in bot development is testing. Fully test all bot tasks before they are deployed to production. The goal is to identify and correct known errors, and prevent unexpected events from causing the bot to fail. If a bot does not pass testing:

- Correct the error
- Put error handling processes in place

## Error handling web bots

Creating bots for browser-based applications can be a moving target. If a web page changes it often breaks the bot. If a web page doesn't appear when the bot expects, it can cause an error. The key to a successful bot is predicting and handling unexpected events.

When creating bots that rely on network connectivity, ensure to include steps for gracefully handling networking connectivity issues. If your bot works with a web browser it needs to gracefully handle when the browser cannot load the target page due to an outage.

For example, consider a bot that downloads a file from a web site. After clicking on the download link, the bot waits 15 seconds for the download prompt to appear in the browser. The bot uses a wait for window to exist command to determine when the Save As dialog appears.

## Commenting

Most bots require changes after they are placed into production. Use comment to help updates and maintenance.

Most bots require changes after they are placed into production. Sometimes those changes can be frequent, depending on the type and scope of the bot. The difference between a change being a relatively straight-forward task and a complete nightmare is determined by two things: how clean is the bot architecture, and how well the bot is documented and commented.

Good commenting can mean a difference of hours during a maintenance cycle. Write all comments in the same language, ensure they are grammatically correct and contain appropriate punctuation.

## General Commenting Rules

- Box important sections with repeating slashes, asterisks, or equal signs:

```

1  Comment: =====
2  Comment: This is a helper task designed to print a document in the form of a PDF file.
3  Comment: It is not designed to be run standalone.
4  Comment: =====

```

- Use one-line comments to explain assumptions, known issues and logic insights, or mark automation segments:

```

5  Comment: === Warn user is this task is being run in standalone mode ===
6  IF $vTargetFileName$ Equal To (=) "" Then
7      Message Box: "This task is not designed to be run by itself, it is only designed to be called by another task. Please run the master task. This automation will now stop."
8      Stop The Current Task
9  End If
...
10 Comment: === ctrl+p to save as PDF ===
11 $ Variable Operation: false To $vSuccess$
12 Begin Error Handling; Action: Continue; Options: Variable Assignment, Task Status: Fail
13 Keystrokes: [CTRL DOWN]p[CTRL UP] in "$vWindowTitle$"

```

- Make comments meaningful:

1    Comment: === Set vSearchPage to 1 ===  
 2    Variable Operation: 1 To \$vSearchPage\$ **Incorrect**

1    Comment: ======  
 2    Comment: Initialize vSearchPage to 1, we'll increment this as we loop through the result pages and exit the loop.  
 3    Comment: when the max value is reached. The max value is set by the number of results listed on the first page.  
 4    Comment: ======  
 5    Variable Operation: 1 To \$vSearchPage\$ **Correct**

- Always use comments when you identify bad task lines with some common phrase, such as //FIX THIS
  - otherwise remove or rewrite that part of the task!
- Include comments using Task-List keyword flags to allow comment-filtering. Example:

```
// TODO: Place database command here
```

```
// UNDONE: Removed keystroke command due to errors  
here
```

- Never leave disabled task lines in the final production version. Always delete disabled task lines.
- Try to focus comments on the why and what of a command block and not the how. Try to help the reader understand why you chose a certain solution or approach and what you are trying to achieve. If applicable, also mention that you chose an alternative solution because you ran into a problem with the obvious solution.

## Naming Conventions

Capitalization and spacing styling in names.

Use bumpyCasing for variables and CamelCasing for task names.

- CamelCase—The practice of writing compound words or phrases where each word or abbreviation begins with a capital letter. For example `PrintUtility`.
- bumpyCase—The same, but always begins with a lower letter. For example `backgroundColor`.

The following is a list of naming restrictions:

- Do not use underscores.—Underscores waste space and do not provide any value in these contexts. Readability can be achieved by using Bumpy Casing and Camel Casing.
- Consistent values and flags.—Always use lower case Boolean values "true" and "false". Never deviate, stick to this method of defining a boolean state. This also applies to flags. Always use "true" or "false" for Boolean variables, never a 0 or 1 or anything else.

```
Variable Operation: false To $vSkipSegment$  
If $vSkipSegment$ Equal To (=) "false" Then  
  Variable Operation: $vPrismWebPath$ To $vTempFilePath$  
  Variable Operation: Preliminary Bill AttachmentsBill: $vBillingBillNumber$ Customer: $vCustomerNumber$Contract: $vContractNumber$ To $vTitleSheetText$
```

- Variable names—

Don't include numbers in variable names.

Avoid single character variable names. Never use `i` or `x` for example. Use a variable name that provides some clue about the variable purpose.

- Flag and Script names—

Name flags with `Is`, `Has`, `Can`, `Allows` or `Supports`, like `isAvailable`, `isNotAvailable`, `hasBeenUpdated`.

Name scripts with a noun, noun phrase or adjective like Utility or Helper for example `FileSaveHelper.atmx`.

- Pre-fixed fields—Don't prefix fields. For example, don't use `g_` or `s_` or just `_`.  
Exception is the letter `v` as a prefix in order to make finding variables easier.
- Verb-object naming—Also use verb-object pairs when naming scripts like `GetMostRecentVersion`.  
Name variables with a descriptive name like `employeeFirstName` or `socialSecurityNumber`.

## Defining logs

When designing logs, make them easy to read and easy to parse.

Log files store messages issued from various application and system components.

Logs need to be easy to read, understand, and parse. Keep the log file readable, clean, and descriptive. Show the data being processed and show its meaning. Show what the bot is actually doing. Good logs can serve as a great documentation of the bot itself.

Logs help people and machines to:

- Determine if a process completed successfully.
- If a process does not complete, review information about why a process failed to complete.
- Determine if the bot is performing as expected.
- Interactively follow the logs.
- Parse the logs with a tool or import the logs into Excel to gather and analyze metrics.
- Import the logs into a database.

The following is a set of standards to ensure logging is properly executed.

## Types of logs

- Process/Informational—The process log is meant to be an informational log. It can be used for monitoring normal operation of a task, but more importantly, it can be used for auditing. Using the process log for an audit trail can be an excellent method for determining if a business process was completed properly. For example, was an order placed, or a ticket completed without error.

- Error—The error log is for detailed error messages. When an error occurs in a task, place the notification that an error occurred in the process log. Place detailed information about the error in the error log.
- Debug—Store debugging information in its own log file and turn debug collection off when in production mode. Use an `isProductionMode` variable to turn these statements off when the bot is moved to production.
- Performance—Performance logging can either go into either the process/informational log or the performance log. In some cases, it is useful to store performance message in its own log file.

## Types of messages

- ERROR—Something terribly wrong had happened, that must be investigated immediately. The task cannot perform its function properly here. For example: database unavailable, mission critical use case cannot be continued, file is busy and cannot be opened.
- WARN—The task might be continued, but take extra caution. For example: Task is running in development mode. The task can continue to operate, but always justify and examine the message.
- INFO—Important business process has finished. The information message, sometimes cryptically, states information about the application. For example:
  - Application action complete. Best case for an airline booking application, it issues only one INFO statement per each ticket, and it states [Who] booked ticket from [Where] to [Where].
  - Application changes state significantly. Database update or External system request
- DEBUG—Any information that is helpful in debugging a bot, typically for use by the bot developer. These messages do not go into the process log. Use an `isProductionMode` variable to turn these statements off when the bot is moved to production.
- PERFORMANCE—Performance logging can either go into the process/informational log or it can go into the performance log, if a separate performance log has been created. Performance tracks how long it takes to perform specific steps, but avoid too much granularity. In most cases, limit performance logging to an overall business process. For example, how long it took to complete an order, or how long it took to process an invoice.

## Tips for creating logs

- Consumers

There are two consumers for log files: people and machines.

People consumers—When people are the consumer, their role influences the type of information they are looking for. A developer might need information to debug, analyze performance, or locate errors. An analyst might need audit information or performance information.

Machine consumers—Machines read log files typically through shell scripts written by system administrators. Design logs suitable for both these log file consumers.

- Content

- Include objects—A good logs includes: timestamp, logging level, machine name, name of the task, and the message.
- Error log statements.—Include the line number and error description for any error from the Automation Anywhere error handling block.

- Debug statements—Use debugging log statements when passing variable between sub-tasks. Include the variable values as they enter and exit a sub-task. Use `isProductionMode` variable to turn off debugging statement when the bot is moved to production.
- Interface calls—if a bot interfaces with other systems, such as Metabots, APIs, REST or SOAP calls, log those calls and, if appropriate, their responses.

- Formatting

- Delimiters—Delimit content values. To support easy log file importing and parsing, use tab delimiting to separate the values.
- Log-to-file—Use the log-to-file feature built into Automation Anywhere.
- Timestamp—Use the built-in time stamp in the log to file command.

Note: Don't create your own method and format for time stamping, even for Excel. Only modify from the built-in version, if there is a specific need for different timestamp.

- Security and shortcuts

- Passwords—Never log passwords or any personal information!
- Short cuts—Do not add short-cut characters and scripts, (magic codes), that only a few people can understand.
- Numbering—Avoid number formatting. Use patterns that can be easily recognized by regular expressions.

- Performance

- Excessive logging—Normal logging commands themselves are not costly in terms of performance. However, do not allow excessive logging. For example, multiple iterations inside of a small loop.
- Frequency—Create new logs every 24 hours. Add code to check the current date. If the day has changed, create a new log. Compress and archive (dozing) older log files, as needed. This prevents excessively large log files.

## VB Script

VB script option.

Automation Anywhere has the ability to call VB script. However, we recommend that you use alternative methods if at all possible. Limit your use of VB script to situations where there are simply no other choices. The reasons are:

- VB script is difficult to maintain
- VB script is typically not understood by the customer
- VB script files are usually prohibited by most IT departments
- VB script files cannot easily be moved (blocked by email)

---

Another thing to remember is to never use Enterprise Identity Management to write VB script, or create a VB script file. Doing so is extremely difficult to maintain and is an anti-pattern at best. At worst, it demonstrates the ability to embed and deliver a malicious payload in a bot.

## Configuration Files

Use configuration files to separate initial variable values.

Always separate the initial variable values from the task. You must change the variable values when you run the task in different environments such as UAT or PROD. Use a configuration file and read those variables into the task at start time. Make use of system path variables to load the configuration file. This ensures the configuration file can be located no matter where Enterprise Identity Management is installed on the system.

# Enterprise Control Room installation

Review the installation core tasks and topics for installing Enterprise Control Room in a data center on an on-premise server or a cloud service provider server instance.

The Enterprise Control Room provides centralized management for digital workforce. Interface for Bot Insight. It is deployed on a server in a data center. The installer executable, `Automation_Anywhere_Enterprise_<version_build>.exe`, is included in the `Automation_Anywhere_Setup.zip` file download.

## Enterprise Control Room installation core tasks

Step 1: Pre-installation

### [Enterprise Control Room prerequisites](#)

Verify the hardware, software, and configuration required to install Enterprise Control Room. Confirm the data center is configured to support the Enterprise Control Room and its functions.

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 Microsoft Azure or Amazon Web Services.

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

Login to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Express Mode using the default settings.

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

Login 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 data center deployment.

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

From Microsoft Azure, login to a server instance as Administrator. Then start the Enterprise Control Room installer and select Custom mode.

### [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.

### [Installing Enterprise Control Room on Google Cloud Platform](#)

Login to a Google Cloud Platform (GCP) server instance as Administrator. Then download and start the Enterprise Control Room installer and select Custom mode.

### [Installing Enterprise Control Room using scripts](#)

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized Powershell 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.

Automation Anywhere Version 11.3 - After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings ensure timely Automation Anywhere communications.

### Step 3: Post-installation

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

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings ensure timely Automation Anywhere communications.

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

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

#### [Configuring 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.

#### [Configuring 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.

#### [Configuring Access Manager Reverse Proxy](#)

Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room

#### [Configuring for IQ Bot versions](#)

For selected versions of IQ Bot you need to adjust configuration in the `cluster.properties` file. Add `ignite.security.disable` and/or `ignite.tls.disable` parameters, as needed.

### Step 4: Validation

#### [Installing a license](#)

A Enterprise Control Room administrator or a user with license management permission can install a license and evaluate the latest version.

#### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## Enterprise Control Room pre-installation

Review and verify the requirements and options before installing Enterprise Control Room.

- [Enterprise Control Room prerequisites](#)

Verify the hardware, software, and configuration required to install Enterprise Control Room. Confirm the data center is configured to support the Enterprise Control Room and its functions.

## Enterprise Control Room prerequisites

Verify the hardware, software, and configuration required to install Enterprise Control Room. Confirm the data center is configured to support the Enterprise Control Room and its functions.

The Enterprise Control Room is installed on servers in a data center. The servers can be physical or a virtual machine as an instance with a cloud provider, such as Microsoft Azure or Amazon Web Services.

## Hardware requirements

### Hardware requirements

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

### Operating system and platform compatibility

Enterprise Control Room and Enterprise client both are installed on machines with supported operating systems. The Enterprise Control Room and Enterprise client tables list the supported Windows versions.

### Supported plug-ins and services

Enterprise Control Room and Enterprise client require and support the listed Microsoft Windows services and browser plug-ins. Some are optionally installed with Automation Anywhere Enterprise deployment.

### 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

Two database instances of the same database type are created during Automation Anywhere installation. 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.

### 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.

### Network data rate requirements

The data transmission rates required between Automation Anywhere components and the data center are listed.

### Version control requirements

Optionally, install a supported version control system in your Automation Anywhere data center.

### Supported browsers

Supported browsers are used to access the Enterprise Control Room. In the Enterprise client, build bots with tasks that use a supported browser. Some tasks and functions require an Automation Anywhere plug-in.

### Capacity and performance planning

To plan your deployment capacity and performance, understand the requirements, limits, and defaults that determine the number of simultaneous bots, user sessions, and processing rates.

### HA, DR, 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, Highly Available (HA) clusters at single locations, and Disaster Recovery (DR) across geographically separated sites.

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

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

### [Disaster Recovery deployment model](#)

The Disaster Recovery (DR) deployment model uses high availability (HA) clusters distributed over a geographic area.

Related concepts

[Enterprise client installation](#)

Related reference

[Enterprise Control Room installation](#)

## Installing Enterprise Control Room using Express mode

Login to the server as Administrator, and install Automation Anywhere Enterprise Control Room in Express Mode using the default settings.

### Prerequisites

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - Automation Anywhere Enterprise Control Room installation file
  - SSL certificate
  - License file

The Express Mode installation quickly sets up the Enterprise Control Room with default parameters for the various components. This installation mode is ideal for showcasing a demo and training purpose. This installation mode is not recommended for the production environment.

### Default Parameters

Microsoft SQL Server is the default database for both Enterprise Control Room and Bot Insight. The Oracle Server database can only be installed through [Installing Enterprise Control Room using Custom mode](#).

The following parameters are installed by default:

Parameter	Default value
SQL database instance	SQLEXPRESS
Authentication type	Windows authentication
Enterprise Control Room database	CRDB-NEW
Bot Insight databases	BIVisualization, BIVisualization-keyset, BIVisualization-scheduler, BIVisualization-upload, and BotInsight
Port	1433

To install Automation Anywhere Enterprise Control Room in Express Mode, follow these steps:

## Procedure

1. Extract all files from the Automation\_Anywhere\_Setup.zip file.
2. Double-click the AAE\_MSSQL\_Express\_2014SP1.exe.

The installation process creates the SQLEXPRESS instance that is used for the Enterprise Control Room and the Bot Insight databases. The installation process uses this instance to create a database with the name CRDB\_NEW and configures the database as the default Enterprise Control Room database.

3. Right-click the Automation Anywhere setup file and select Run as administrator.

**11.3.2** The installation process checks for supported operating system and for minimum hardware requirements and shows the following message if the requirements are not met:

This system does not meet the minimum OS or hardware requirements for installing Automation Anywhere Enterprise.

If you continue installation, some of the product features may not work as expected.

NOTE: Refer Control Room Installation Prerequisites topic for minimum system requirements.

For more information, see [Enterprise Control Room prerequisites](#)

4. Click Next in the Welcome to the Setup Wizard.

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 is not available, the system notifies you with an installation pop-up window. After both components are successfully installed, the License Agreement screen is shown.

5. Accept the licensing agreement and click Next.

**11.3.3** The Installation Prerequisite Check screen is shown.

6. If your system meets all the installation prerequisites, click Continue.

If the installation prerequisites are not met, complete the required system updates, free up some resources and click Refresh before continuing with the installation.

Note: If you continue with the installation when all the prerequisites are not met, some of the Automation Anywhere Enterprise features may not work as designed.

7. Select the Express option and click Next.

The Database Configuration screen appears.

- a) Type the port you want to use to connect to the database server in the Port field.

By default, this is set to 1433.

- b) Optionally, select the Use Windows Authentication option, to use windows authentication to connect to the database server. The system disables the Username and Password fields.

- c) Optionally, select the Sql Server authentication option, to use the SQL server authentication to connect to the database server. Type the credentials to be used to connect to the database server in the Username and Password fields.

Note: The user who connects to the database server must have database creator rights.

- d) Type the name of the database that you want to use for Enterprise Control Room in the Name of Control Room database field.

- e) Type name of the database you want to use for Bot Insight in the Name of Bot Insight database field.

8. Click Next.

The Ready to Install the Program screen appears.

9. Click Install and allow the installation process to complete.

- The InstallShield Wizard Completed screen appears.
10. Click Finish.  
Launch Automation Anywhere is enabled by default.  
The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed.  
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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

Related concepts

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

Related reference

#### [Configuring Enterprise Control Room authentication options](#)

## Installing Enterprise Control Room using Custom mode

Login 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 data center deployment.

Step 1: Prepare for installation.

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - Automation Anywhere Enterprise Control Room installation file
  - SSL certificate
  - License file

**Step 2: Run Enterprise Control Room installer**

Start the Enterprise Control Room installer from the installation server, logged in as an Administrator. From this stage of the installation wizard you, accept the licensing agreement, check the installation prerequisites, and select the installation file path.

**Step 3: Configure the IP cluster**

Continue from the Enterprise Control Room installer to the Cluster Configuration wizard page. From this stage of the installation wizard you, setup the system IPs for configuring the Enterprise Control Room on single 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. From this stage of the installation wizard, you generate a self signed certificate 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. From this stage of the installation wizard you, specify the user account to use for running the 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. From this stage of the installation wizard you, configure the type of database type, Microsoft SQL Server or Oracle Server, to be used for Enterprise Control Room database.

**Step 7: Configure the Bot Insight database**

Continue from the Enterprise Control Room installer to the Bot Insight database portion of the Database type wizard page. From this stage of the installation wizard, you configure the database type for the Bot Insight metadata.

**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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

**[Enterprise Control Room post-installation validation](#)**

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

**Step 10: Prepare for users.****[User management overview](#)**

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

**[Enterprise client installation](#)**

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## Run Enterprise Control Room installer

Start the Enterprise Control Room installer from the installation server, logged in as an Administrator. From this stage of the installation wizard you, accept the licensing agreement, check the installation prerequisites, and select the installation file path.

To install Automation Anywhere Enterprise Control Room in Custom Mode, follow these steps.

### Procedure

1. Extract all files from the Automation\_Anywhere\_Setup.zip file.
2. Right-click the Automation Anywhere setup file and select Run as administrator.

**11.3.2** The installation process checks for supported operating system and for minimum hardware requirements and shows the following message if the requirements are not met:

This system does not meet the minimum OS or hardware requirements for installing Automation Anywhere Enterprise.

If you continue installation, some of the product features may not work as expected.

NOTE: Refer Control Room Installation Prerequisites topic for minimum system requirements.

For more information, see [Enterprise Control Room prerequisites](#)

3. Click Next in the Welcome to the Setup Wizard.

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 is not available, the system notifies you with an installation pop-up window. After both components are successfully installed, the License Agreement screen is shown.

4. Accept the licensing agreement and click Next.

**11.3.3** The Installation Prerequisite Check screen is shown.

5. If your system meets all the installation prerequisites, click Continue.

If the installation prerequisites are not met, complete the required system updates, free up some resources and click Refresh before continuing with the installation.

Note: If you continue with the installation when all the prerequisites are not met, some of the Automation Anywhere Enterprise features may not work as designed.

6. Select the Custom option and click Next.

The Destination Folder screen appears. By default, the destination folder is C:\Program Files\Automation Anywhere\Enterprise\.

7. 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:\). Create or select a folder for installation instead, for instance C:\Program Files\Automation Anywhere\Enterprise\.

8. Click Next to [configure the IP cluster](#).

## Configure IP cluster

Continue from the Enterprise Control Room installer to the Cluster Configuration wizard page. From this stage of the installation wizard you, setup the system IPs for configuring the Enterprise Control Room on single or multiple nodes (High Availability).

## Prerequisites

Ensure that all nodes to be configured for IP Cluster are available for configuration in advance of installation. Also, provide the same list of IPs in all the nodes participating in the cluster when you install Enterprise Control Room in these nodes.

To configure the system IPs, do the following steps:

## Procedure

1. Enable Cluster Setup.

The checkbox is marked by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room without a cluster, do not mark Enable Cluster Setup.

2. Enter the IP addresses of the nodes for the cluster.

a) Use a comma (,) to specify more than one IP address. For example, 192.161.1.1, 192.161.1.2, 192.161.1.3 and so on.

a) If you Enable Cluster Setup and do not type an IP, an error message displays.

b) If you supply invalid numbers or characters, an error message displays.

b) Once you correctly input the cluster IP's, a pop-up message prompts you to select a valid IP that gives network access to this machine.

c) Select the IP from the Local IP drop down list.

If multiple local IP's are configured on the machine, select the IP on which Enterprise Control Room is installed as it will be used to access the Enterprise Control Room from other nodes.

**CAUTION:** Once configured, you cannot add or remove nodes from the list of IP's.

3. Click Next to configure the application [Transport Layer Security \(TLS\)](#).

Related reference

[High Availability deployment model](#)

## Configure application Transport Layer Security

Continue from the Enterprise Control Room installer to the Transport Layer Security (TLS) configuration wizard page. From this stage of the installation wizard, you generate a self signed certificate or import a security certificate to setup a highly secure Enterprise Control Room instance.

## Procedure

1. The TLS Configuration screen displays where you can either:

- Generate a Self-Signed Certificate

When the Self-Signed Certificate option is enabled, the installer generates 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 check box and use the Certificate Path field to import a certificate.

Note: The certificate file must be in the 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 Webserver 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 Webserver and if that is already in use for Enterprise Control Room license service. Use a different unassigned port in above cases.

- Enable Force HTTP traffic to HTTPS: To redirect all HTTP port requests to HTTPS. To access the Enterprise Control Room via HTTPS using the generated self-signed certificate. Ensure the port number is different for both.

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

## Configure service credentials

Continue from the Enterprise Control Room installer to the Service Credentials wizard page. From this stage of the installation wizard you, specify the user account to use for running the 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 needs to:

- Be a member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.
- For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.
- Have Database Owner (DBO) permissions.

The 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.

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, or the Enterprise Control Room fails to launch.

- PowerShell script restrictions.

Specify a user with permissions to launch PowerShell scripts, that is not a Windows domain user, or database table creation can fail.

- Remote PostgreSQL Server for creating the database.

Specify a domain user account. Do not use the local system account user when you are using a remote database server for creating the database.

See [Database and Services Matrix](#).

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. From this stage of the installation wizard you, configure the type of database type, Microsoft SQL Server or Oracle Server, to be used for Enterprise Control Room database.

### Procedure

1. Select the database type for Enterprise Control Room and Bot Insight.

Use the same database type for Enterprise Control Room and Bot Insight.

- Microsoft SQL Server

To select this database type, an instance of SQL Server should be already configured.

- 11.3.1 Oracle

To configure Enterprise Control Room and Bot Insight database on Oracle instance, select this option and browse for the Oracle v12.1.0.2 JDBC driver on your local machine.

2. 11.3.3 If the Oracle v12.1.0.2 JDBC driver is not installed, select the download link based on your connection requirements - secure or non-secure.

3. Click Next.

The Database Server page is displayed.

4. Set connection, authentication, and databases.

- Database Server

This page appears if you select SQL Server for configuring your database.

Note:

- If possible, do not set the value for Database Server as `localhost`, or the Secure Connection to the database does not work.
- Do not use Windows authentication if the Enterprise Control Room and the SQL server are on separate accounts.

- For Azure installations, the database names for Enterprise Control Room and Bot Insight must be the same, or installation fails.
- Click the Browse button to select the SQL server instance where the Enterprise Control Room database will be created. Alternately, type a database server name or select one from the list.

Provide the following details:

#### Database Port

Use the default port (1433) or specify a custom value.

#### Use Secure Connection

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

#### Certificate

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

#### Windows authentication

This option is selected by default. This allows for connecting to the SQL Server using Windows authentication.

Note: If user selects Windows Authentication, then the user running the installer is used to test that the database exists, and create it if necessary, and grant db\_owner to the service account user (NT Authority/System). See matrix for creating database, tables, and services in [Working with SQL Servers](#).

This user must have Database Owner (DBO) permissions. .

#### SQL Server authentication

Select this option to use SQL server Authentication to connect to the database. Provide correct username and password for SQL Authentication.

This user must have Database Owner (DBO) permissions.

#### Name of Enterprise Control Room database

Enter the name for the Enterprise Control Room database.

#### Name of Bot Insight database

Enter the name for the Bot Insight database. This database is used to store the Bot Insight data.

Note: The database names cannot be blank, have spaces, or include % (percent character). It is recommended to restrict the names to alphanumeric, period (.), dash (-), and underscore (\_).

If the database (Enterprise Control Room and or Bot Insight) does not exist, the installer will create one automatically.

- 11.3.1 Oracle Server

This page appears if you select Oracle Server for configuring your database.

Provide the following details:

#### Database Server

Provide the server hostname details. The users should have been created in the Oracle database by the system admin before running the installation. See [how to create users in Oracle](#).

**Database Port**

Connect using the default database port (1521) or with a custom port as defined by the system admin.

**Database Instance Name**

Enterprise Control Room database instance name that was created initially by the system admin.

**Control Room cluster Database Username**

Enterprise Control Room database username that was created initially by the system admin.

This user has DBO permissions.

**Control Room cluster Password**

Password of the Enterprise Control Room database user.

**Bot Insight Database Username**

Bot Insight database username that was created initially by the system admin. This user has Database Owner (DBO) permissions.

**Bot Insight Password**

Password of the Bot Insight database user.

**Use Secure Connection**

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

**Certificate**

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

- Click Next to [Configure the Bot Insight database](#).

- [Import a CA certificate](#)

After the Enterprise Control Room installation, import a Certificate Authority (CA) certificate using the command prompt.

## Import a CA certificate

After the Enterprise Control Room installation, import a Certificate Authority (CA) certificate using the command prompt.

To import a CA certificate using the command prompt, do the following steps:

## Procedure

- Run the command prompt in administrator mode.
- Copy the Automation Anywhere installation path.  
The default installation path is C:\Program Files\Automation Anywhere\Enterprise.
- Type or paste the following command at the prompt:

```
jre\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -importTrustCert "D:\<user name>\My Downloads\CA31.cer"
```

- Add the following parameters to the boot.db.properties file that is found in the config folder, in the Automation Anywhere installation path.

C:\Program Files\Automation Anywhere\Enterprise\config trustServerCertificate=false

## Configure the Bot Insight database

**11.3.1** Continue from the Enterprise Control Room installer to the Bot Insight database portion of the Database type wizard page. From this stage of the installation wizard, you configure the database type for the Bot Insight metadata.

- If the Microsoft SQL Server database was selected for storing Enterprise Control Room data: select either Microsoft SQL Server or PostgreSQL Server.
- If the Oracle Server database was selected for storing Enterprise Control Room data: your only choice is PostgreSQL Server.

## Procedure

1. **11.3.1** Select either PostgreSQL Server or Microsoft SQL Server database to store metadata for Bot Insight.

Note: Microsoft SQL Server option is not available with Oracle database.

- PostgreSQL Server  
Select PostgreSQL Server to establish a separate database server for storing the metadata:
  - a) Click Next to configure PostgreSQL Server hostname, port, database, username, and password details.
  - b) On the Bot Insight PostgreSQL Configurations page, select the check box to install PostgreSQL Server. Clear this option if the PostgreSQL Server is already installed and supply the following:

### Hostname

Enter the hostname for the PostgreSQL Server. The default name is localhost.

### Port

Enter the port number for the PostgreSQL Server. The default Port number is 5432.

### Database

Enter the database name that will be used for Bot Insight. By default, the database name is zoomdata.

### Use Secure Connection

Select this option if your PostgreSQL Server database uses a secure connection.

### Username

Enter the user name for the PostgreSQL Server database. The default username is postgres.

This user must have Database Owner (DBO) permissions.

### Password

Enter the password for the PostgreSQL Server database.

### Confirm Password

This is only visible when the Install PostgreSQL option is selected.

Note: If PostgreSQL Server option is selected, the Hostname and Use Secure Connection fields are disabled and set to default values.

- Microsoft SQL Server

Microsoft SQL Server is the default metadata database type and the default name is set to BIVisualization. You can opt to change the database name.

Note: Along with the BIVisualization database, three other databases, BIVisualization-keyset, BIVisualization-scheduler, BIVisualization-upload, are created by default for storing dashboard configuration information.

2. Click Next to complete the Enterprise Control Room installation process and optionally view the [Install summary page](#).

## 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.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed.

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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user.

Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

## Enterprise client installation

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

### Related tasks

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

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

[Import a CA certificate](#)

[Import certificate for HTTPS](#)

### Related reference

[Working with SQL Servers](#)

## Installing Enterprise Control Room on Microsoft Azure

From Microsoft Azure, login to a server instance as Administrator. Then start the Enterprise Control Room installer and select Custom mode.

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

Step 1: Prepare for installation.

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - Automation Anywhere Enterprise Control Room installation file
  - SSL certificate
  - License file

Step 2: [Verify readiness for installation](#)

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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

---

Step 6: Prepare for users.

#### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

#### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## Verify readiness for installation

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

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might 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 or PostgreSQL Server - port credentials
- SMB file share - address credentials
- Subversion server (optional) - port 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 firewall rule:



- 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 Version 11.3 on the Microsoft Azure cluster environment are identified for each component.

## Supported data center component versions on Microsoft Azure

The supported operating system versions for installing Automation Anywhere Version 11.3 on the Microsoft Azure cluster environment are identified for each component.

Data center object	Version	Configuration
Enterprise Control Room operating system	Windows 2016	IaaS
Enterprise client operating system	Windows 2012 R2	IaaS
Identity management: <a href="#">Azure Active Directory</a>	Azure Active Directory	IDaaS Windows 2016 for IaaS
<a href="#">SMB File Share</a>	Azure File Share	PaaS (50 GB)

Data center object	Version	Configuration
Load Balancer	Azure Load Balancer (Not Application Gateway)	PaaS
PostgreSQL Server	Azure PostgreSQL (9.5.14 and SSL Disabled)	PaaS
Microsoft SQL Server	Azure SQL Database (Microsoft SQL Azure (RTM) - 12.0.2000.8)	PaaS
Subversion server	Bitnami Subversion 1.10.0-0 (Linux)	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](#).

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might 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 in the Welcome to the Setup Wizard.

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 is not available, the system notifies you with an installation pop-up window. After both components are successfully installed, the License Agreement screen is shown.

4. Accept the licensing agreement and click Next.

**11.3.3** The Installation Prerequisite Check screen is shown.

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](#).

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

In this task you provide the configuration information you gathered in the prerequisites stage. This includes IP addresses, certificates, and credentials for the the Enterprise Control Room servers, datacenter servers, and databases. To install the Enterprise Control Room in a cluster setup, do the following steps:

## Procedure

### 1. Enable Cluster Setup.

The checkbox is marked by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room without a cluster, do not mark Enable Cluster Setup.

### 2. Enter the IP addresses of the nodes for the cluster.

a) Use a comma (,) to specify more than one IP address. For example, 192.161.1.1, 192.161.1.2, 192.161.1.3 and so on.

a) If you Enable Cluster Setup and do not type an IP, an error message displays.

b) If you supply invalid numbers or characters, an error message displays.

b) Once you correctly input the cluster IP's, a pop-up message prompts you to select a valid IP that gives network access to this machine.

c) Select the IP from the Local IP drop down list.

If multiple local IP's are configured on the machine, select the IP on which Enterprise Control Room is installed as it will be used to access the Enterprise Control Room from other nodes.

CAUTION: Once configured, you cannot add or remove nodes from the list of IP's.

### 3. Click Next to configure the application Transport Layer Security (TLS).

### 4. The TLS Configuration screen displays where you can either:

- Generate a Self-Signed Certificate

When the Self-Signed Certificate option is enabled, the installer generates 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 check box and use the Certificate Path field to import a certificate.

Note: The certificate file must be in the 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 Webserver 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 Webserver and if that is already in use for Enterprise Control Room license service. Use a different unassigned port in above cases.

- Enable Force HTTP traffic to HTTPS: To redirect all HTTP port requests to HTTPS. To access the Enterprise Control Room via HTTPS using the generated self-signed certificate. Ensure the port number is different for both.

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 needs to:

- Be a member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.
- For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.
- Have Database Owner (DBO) permissions.

The 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.

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, or the Enterprise Control Room fails to launch.

- PowerShell script restrictions.

Specify a user with permissions to launch PowerShell scripts, that is not a Windows domain user, or database table creation can fail.

- Remote PostgreSQL Server for creating the database.

Specify a domain user account. Do not use the local system account user when you are using a remote database server for creating the database.

See [Database and Services Matrix](#).

7. Click Next to configure database type and server.
8. Set connection, authentication, and databases.
  - Database Server

This page appears if you select SQL Server for configuring your database.

Note:

- If possible, do not set the value for Database Server as `localhost`, or the Secure Connection to the database does not work.
- Do not use Windows authentication if the Enterprise Control Room and the SQL server are on separate accounts.
- For Azure installations, the database names for Enterprise Control Room and Bot Insight must be the same, or installation fails.
- Click the Browse button to select the SQL server instance where the Enterprise Control Room database will be created. Alternately, type a database server name or select one from the list.

Provide the following details:

#### Database Port

Use the default port (1433) or specify a custom value.

#### Use Secure Connection

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

#### Certificate

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

#### Windows authentication

This option is selected by default. This allows for connecting to the SQL Server using Windows authentication.

Note: If user selects Windows Authentication, then the user running the installer is used to test that the database exists, and create it if necessary, and grant `db_owner` to the service account user (NT Authority/System). See matrix for creating database, tables, and services in [Working with SQL Servers](#).

This user must have Database Owner (DBO) permissions. .

#### SQL Server authentication

Select this option to use SQL server Authentication to connect to the database. Provide correct username and password for SQL Authentication.

This user must have Database Owner (DBO) permissions.

#### Name of Enterprise Control Room database

Enter the name for the Enterprise Control Room database.

#### Name of Bot Insight database

Enter the name for the Bot Insight database. This database is used to store the Bot Insight data.

Note: The database names cannot be blank, have spaces, or include % (percent character). It is recommended to restrict the names to alphanumeric, period (.), dash (-), and underscore (\_).

If the database (Enterprise Control Room and or Bot Insight) does not exist, the installer will create one automatically.

- 11.3.1 Oracle Server

This page appears if you select Oracle Server for configuring your database.

Provide the following details:

**Database Server**

Provide the server hostname details. The users should have been created in the Oracle database by the system admin before running the installation. See [how to create users in Oracle](#).

**Database Port**

Connect using the default database port (1521) or with a custom port as defined by the system admin.

**Database Instance Name**

Enterprise Control Room database instance name that was created initially by the system admin.

**Control Room cluster Database Username**

Enterprise Control Room database username that was created initially by the system admin.

This user has DBO permissions.

**Control Room cluster Password**

Password of the Enterprise Control Room database user.

**Bot Insight Database Username**

Bot Insight database username that was created initially by the system admin. This user has Database Owner (DBO) permissions.

**Bot Insight Password**

Password of the Bot Insight database user.

**Use Secure Connection**

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

**Certificate**

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

9. Click Next to configure the Bot Insight database.
10. **11.3.1** Select either PostgreSQL Server or Microsoft SQL Server database to store metadata for Bot Insight.

Note: Microsoft SQL Server option is not available with Oracle database.

- PostgreSQL Server

Select PostgreSQL Server to establish a separate database server for storing the metadata:

a) Click Next to configure PostgreSQL Server hostname, port, database, username, and password details.

b) On the Bot Insight PostgreSQL Configurations page, select the check box to install PostgreSQL Server. Clear this option if the PostgreSQL Server is already installed and supply the following:

**Hostname**

Enter the hostname for the PostgreSQL Server. The default name is localhost.

**Port**

Enter the port number for the PostgreSQL Server. The default Port number is 5432.

**Database**

Enter the database name that will be used for Bot Insight. By default, the database name is zoomdata.

**Use Secure Connection**

Select this option if your PostgreSQL Server database uses a secure connection.

**Username**

Enter the user name for the PostgreSQL Server database. The default username is `postgres`.

This user must have Database Owner (DBO) permissions.

**Password**

Enter the password for the PostgreSQL Server database.

**Confirm Password**

This is only visible when the Install PostgreSQL option is selected.

Note: If PostgreSQL Server option is selected, the Hostname and Use Secure Connection fields are disabled and set to default values.

- Microsoft SQL Server

Microsoft SQL Server is the default metadata database type and the default name is set to `BIVisualization`. You can opt to change the database name.

Note: Along with the `BIVisualization` database, three other databases, `BIVisualization-keyset`, `BIVisualization-scheduler`, `BIVisualization-upload`, are created by default for storing dashboard configuration information.

11. Click Next.

The Ready to Install the Program screen appears.

12. Click Install and allow the installation process to complete.

The InstallShield Wizard Completed screen appears.

13. Click Finish.

Launch Automation Anywhere is enabled by default.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed.

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.

## Prerequisites

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

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

This topic describes the configuration steps required after the Enterprise Control Room installation. 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, SVN and SMTP settings.

## Procedure

1. From the Azure Portal where [SMB File Share](#) is setup, get the Connection String to retrieve following parameters:
  - a) Internet or network address
  - b) User name
  - c) 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. On the SVN server please change the repository path from "subversion" to "subversion/repo" in the /opt/bitnami/apache2/conf/httpd.conf file and make following changes:
  - a) Create new repository and update the path in httpd.conf    SVNPath sudo mkdir /opt/bitnami/repositories sudo svnadmin
  - b) Create /opt/bitnami/repositories/aaerepo sudo chown -R bitnami:bitnami /opt/bitnami/repositories
  - c) Create Users for basic authentication with below commands (httpd.conf for Apache configuration with in Location Tag for subversion AuthType Basic):
    - d) AuthName "Subversion repository"
    - e) AuthUserFile /opt/bitnami/repository/users require valid-user
    - f) SSLRequireSSL
  - g) Adding an individual user: sudo /opt/bitnami/apache2/bin/htpasswd -c /opt/bitnami/repository/users aaeuser cd /opt/bitnami/apache2/conf Edit httpd.conf and update the svn path <Location /subversion/repo> DAV svn SVNPath "/opt/bitnami/repositories/aaerepo"
  - h) Save
  - i) Restart subversion and Apache
  - j) Make certain the repo has been added with write permissions.

Upon successful registration of SVN on Enterprise Control Room, the Settings summary screen displays.

11. 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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## 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: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

Step 1: Prepare for installation

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - 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.

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### 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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

### Step 5: Prepare for users.

#### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

#### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## 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 steps:

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: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

To prepare AWS instances, do the following steps:

## 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) (Omit this step if the master database user installs the Enterprise Control Room). Create the following six empty databases and assign `db_owner` privileges to the master database user for all of the databases:

  - d) CRDB (Control Room Database)
  - e) BotInsight (BI Database)
  - f) BIVisualization
  - g) BIVisualization-keyset
  - h) BIVisualization-scheduler
  - i) BIVisualization-upload
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 should 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: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might 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. Right-click the Automation Anywhere setup file and select Run as administrator.

**11.3.2** The installation process checks for supported operating system and for minimum hardware requirements and shows the following message if the requirements are not met:

This system does not meet the minimum OS or hardware requirements for installing Automation Anywhere Enterprise.

If you continue installation, some of the product features may not work as expected.

NOTE: Refer Control Room Installation Prerequisites topic for minimum system requirements.

For more information, see [Enterprise Control Room prerequisites](#)

4. Click Next in the Welcome to the Setup Wizard.
- 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 is not available, the system notifies you with an installation pop-up window. After both components are successfully installed, the License Agreement screen is shown.
5. Accept the licensing agreement and click Next.

**11.3.3** The Installation Prerequisite Check screen is shown.

6. Select the Custom option and click Next.

The Destination Folder screen appears. By default, the destination folder is `C:\Program Files\Automation Anywhere\Enterprise`.

7. 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:\`). Create or select a folder for installation instead, for instance `C:\Program Files\Automation Anywhere\Enterprise`.

8. Click Next to [configure the IP cluster](#).

9. Enable Cluster Setup.

The checkbox is marked by default if the machine on which the setup is being run has local IP addresses configured.

- To install the Enterprise Control Room without a cluster, do not mark Enable Cluster Setup.
10. Enter the IP addresses of the nodes for the cluster.
    - a) Use a comma (,) to specify more than one IP address. For example, 192.161.1.1, 192.161.1.2, 192.161.1.3 and so on.
      - a) If you Enable Cluster Setup and do not type an IP, an error message displays.
      - b) If you supply invalid numbers or characters, an error message displays.
    - b) Once you correctly input the cluster IP's, a pop-up message prompts you to select a valid IP that gives network access to this machine.
    - c) Select the IP from the Local IP drop down list.

If multiple local IP's are configured on the machine, select the IP on which Enterprise Control Room is installed as it will be used to access the Enterprise Control Room from other nodes.

- CAUTION:** Once configured, you cannot add or remove nodes from the list of IP's.
11. Click Next to configure the application Transport Layer Security (TLS).
  12. The TLS Configuration screen displays where you can either:
    - Generate a Self-Signed Certificate

When the Self-Signed Certificate option is enabled, the installer generates 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 check box and use the Certificate Path field to import a certificate.

Note: The certificate file must be in the 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 Webserver 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 Webserver and if that is already in use for Enterprise Control Room license service. Use a different unassigned port in above cases.

    - Enable Force HTTP traffic to HTTPS: To redirect all HTTP port requests to HTTPS. To access the Enterprise Control Room via HTTPS using the generated self-signed certificate. Ensure the port number is different for both.
  13. Click Next to configure the service credentials.
  14. 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 needs to:

- Be a member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.
- For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.
- Have Database Owner (DBO) permissions.

The 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.

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, or the Enterprise Control Room fails to launch.

- PowerShell script restrictions.

Specify a user with permissions to launch PowerShell scripts, that is not a Windows domain user, or database table creation can fail.

- Remote PostgreSQL Server for creating the database.

Specify a domain user account. Do not use the local system account user when you are using a remote database server for creating the database.

See [Database and Services Matrix](#).

15. Add the SQL Server and click Next.

Select Microsoft SQL Server, type the Name, and click Next.

For more information, see [Configure the Bot Insight database](#).

16. Click Finish.

Launch Automation Anywhere is enabled by default.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed.

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: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might 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 [Configuring Enterprise Control Room for Active Directory: manual mode](#).
2. After you configure the Enterprise Control Room, install product licenses. For installation instructions, see [Installing a license](#). For more information on licenses, see [Licenses - an overview](#).
3. Install the Enterprise client interface and start building and running bots. See [Enterprise client installation](#).
4. 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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

# Installing Enterprise Control Room on Google Cloud Platform

Login to a Google Cloud Platform (GCP) server instance as Administrator. Then download and start the Enterprise Control Room installer and select Custom mode.

Note: Because these installation steps do not account for all possible system requirements and configurations, your specific steps might vary and Automation Anywhere does not make any warranties that these steps conform with your specific configurations.

## Step 1: Prepare for installation

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - Automation Anywhere Enterprise Control Room installation file
  - SSL certificate
  - License file

## Step 2: [Prepare Google Cloud Platform instance for installation](#)

In addition to the Enterprise Control Room requirements, ensure your Google Cloud Platform meets these requirements.

## Step 3: [Customize Enterprise Control Room installation on Google Cloud Platform](#)

Install and apply the customized configuration required for the Enterprise Control Room cluster on Google Cloud Platform.

## 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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

## Step 5: Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## Prepare for installation on Google Cloud Platform

In addition to the Enterprise Control Room requirements, ensure your Google Cloud Platform meets these requirements.

### Prerequisites

### Procedure

- Configure the Network Security Group of all the servers as specified in the table below:

- Name: aarestrictedsecuritygroup
- Type: Ingress
- Targets: aarestrictedsecuritygroup
- Filters: IP ranges: LIST of IPs provided by IT Security Team
- Protocols / ports: all
- Action: Allow
- Priority: 1000
- Network: default

Note: In the IP ranges field, enter all the IPs of all VMs in the cluster environment.

- Setup the F5 Load Balancer with the following configurations:

- Type: Standard
- Source address: Select the Host option and enter  
0.0.0.0/0
- Destination Address/Mask: Select the Host option and enter  
F5-LB-Private IP
- Service Port: Mark the Port option, enter 80, and select HTTP.
- Mark the Notify Status to Virtual Address check box.
- State: Enabled

- Setup the Pools and Nodes with the following configurations:

Pools > Properties

- Configuration: Basic
- Health Monitors: Active > /Common > gateway\_icmp

Pools > Members

- Load Balancing Method: Round Robin
- Priority Group Activation: Disabled

Nodes > Properties

- State: Enabled
- Health Monitors: Node Specific
- Active > /Common > icmp

- Configure the Active Directory Server:

Verify that all the VMs in the cluster can ping each other using Private IPs.

Note: All the VMs must be in the same AD Domain except for the F5 Load Balancer.

- RDP to one of the Enterprise Control Room nodes / servers and run the Enterprise Control Room installer.

The Installation Prerequisite Check verifies your system has the basic configurations needed for Automation Anywhere. For more information, see [Enterprise Control Room prerequisites](#).

### Next steps

Continue with [Customize Enterprise Control Room installation on Google Cloud Platform](#)

## Customize Enterprise Control Room installation on Google Cloud Platform

Install and apply the customized configuration required for the Enterprise Control Room cluster on Google Cloud Platform.

### Prerequisites

If you have not done so already, complete the initial installation steps in [Prepare for installation on Google Cloud Platform](#).

To install the Enterprise Control Room in a cluster setup, do the following steps:

### Procedure

1. Click Next in the Welcome to the Setup Wizard.

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 is not available, the system notifies you with an installation pop-up window. After both components are successfully installed, the License Agreement screen is shown.

2. Accept the licensing agreement and click Next.

**11.3.3** The Installation Prerequisite Check screen is shown.

3. Select the Custom option and click Next.

The Destination Folder screen appears. By default, the destination folder is C:\Program Files\Automation Anywhere\Enterprise\.

4. 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:\). Create or select a folder for installation instead, for instance C:\Program Files\Automation Anywhere\Enterprise\.

5. Click Next to configure cluster setup.

6. Enable Cluster Setup.

The checkbox is marked by default if the machine on which the setup is being run has local IP addresses configured.

To install the Enterprise Control Room without a cluster, do not mark Enable Cluster Setup.

7. Enter the IP addresses of the nodes for the cluster.

a) Use a comma (,) to specify more than one IP address. For example, 192.161.1.1, 192.161.1.2, 192.161.1.3 and so on.

a) If you Enable Cluster Setup and do not type an IP, an error message displays.

b) If you supply invalid numbers or characters, an error message displays.

b) Once you correctly input the cluster IP's, a pop-up message prompts you to select a valid IP that gives network access to this machine.

c) Select the IP from the Local IP drop down list.

If multiple local IP's are configured on the machine, select the IP on which Enterprise Control Room is installed as it will be used to access the Enterprise Control Room from other nodes.

CAUTION: Once configured, you cannot add or remove nodes from the list of IP's.

8. Click Next to configure the application Transport Layer Security (TLS).

9. The TLS Configuration screen displays where you can either:
  - Generate a Self-Signed Certificate

When the Self-Signed Certificate option is enabled, the installer generates 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 check box and use the Certificate Path field to import a certificate.

Note: The certificate file must be in the 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 Webserver 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 Webserver and if that is already in use for Enterprise Control Room license service. Use a different unassigned port in above cases.

- Enable Force HTTP traffic to HTTPS: To redirect all HTTP port requests to HTTPS. To access the Enterprise Control Room via HTTPS using the generated self-signed certificate. Ensure the port number is different for both.

10. Click Next to configure the service credentials.

11. 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 needs to:

- Be a member of the local system administrator group.
- Have permission to manage services, including Automation Anywhere services.
- For Microsoft Azure installations, the service account user needs to have read/write access to the remote Microsoft Azure repository share path.
- Have Database Owner (DBO) permissions.

The 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.

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, or the Enterprise Control Room fails to launch.

- PowerShell script restrictions.

Specify a user with permissions to launch PowerShell scripts, that is not a Windows domain user, or database table creation can fail.

- Remote PostgreSQL Server for creating the database.

Specify a domain user account. Do not use the local system account user when you are using a remote database server for creating the database.

See [Database and Services Matrix](#).

12. Click Next to configure database type and server.

13. Set connection, authentication, and databases.

- Database Server

This page appears if you select SQL Server for configuring your database.

Note:

- If possible, do not set the value for Database Server as `localhost`, or the Secure Connection to the database does not work.
- Do not use Windows authentication if the Enterprise Control Room and the SQL server are on separate accounts.
- For Azure installations, the database names for Enterprise Control Room and Bot Insight must be the same, or installation fails.
- Click the Browse button to select the SQL server instance where the Enterprise Control Room database will be created. Alternately, type a database server name or select one from the list.

Provide the following details:

#### Database Port

Use the default port (1433) or specify a custom value.

#### Use Secure Connection

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

#### Certificate

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

#### Windows authentication

This option is selected by default. This allows for connecting to the SQL Server using Windows authentication.

Note: If user selects Windows Authentication, then the user running the installer is used to test that the database exists, and create it if necessary, and grant `db_owner` to the service account user (NT Authority/System). See matrix for creating database, tables, and services in [Working with SQL Servers](#).

This user must have Database Owner (DBO) permissions. .

#### SQL Server authentication

Select this option to use SQL server Authentication to connect to the database. Provide correct username and password for SQL Authentication.

This user must have Database Owner (DBO) permissions.

Name of Enterprise Control Room database

Enter the name for the Enterprise Control Room database.

Name of Bot Insight database

Enter the name for the Bot Insight database. This database is used to store the Bot Insight data.

Note: The database names cannot be blank, have spaces, or include % (percent character).

It is recommended to restrict the names to alphanumeric, period (.), dash (-), and underscore (\_).

If the database (Enterprise Control Room and or Bot Insight) does not exist, the installer will create one automatically.

- **11.3.1** Oracle Server

This page appears if you select Oracle Server for configuring your database.

Provide the following details:

Database Server

Provide the server hostname details. The users should have been created in the Oracle database by the system admin before running the installation. See [how to create users in Oracle](#).

Database Port

Connect using the default database port (1521) or with a custom port as defined by the system admin.

Database Instance Name

Enterprise Control Room database instance name that was created initially by the system admin.

Control Room cluster Database Username

Enterprise Control Room database username that was created initially by the system admin.

This user has DBO permissions.

Control Room cluster Password

Password of the Enterprise Control Room database user.

Bot Insight Database Username

Bot Insight database username that was created initially by the system admin. This user has Database Owner (DBO) permissions.

Bot Insight Password

Password of the Bot Insight database user.

Use Secure Connection

Select Use Secure Connection to use CA certificate as specified.

Note: Use the same host name for certificate and database connections.

Certificate

This option is enabled when you select secure connection. Browse to select a CA certificate. See [Import a CA certificate](#) for details on how to import this certificate using the command line.

14. Click Next to configure the Bot Insight database.

15. **11.3.1** Select either PostgreSQL Server or Microsoft SQL Server database to store metadata for Bot Insight.

Note: Microsoft SQL Server option is not available with Oracle database.

- PostgreSQL Server

Select PostgreSQL Server to establish a separate database server for storing the metadata:

- a) Click Next to configure PostgreSQL Server hostname, port, database, username, and password details.
- b) On the Bot Insight PostgreSQL Configurations page, select the check box to install PostgreSQL Server. Clear this option if the PostgreSQL Server is already installed and supply the following:

**Hostname**

Enter the hostname for the PostgreSQL Server. The default name is localhost.

**Port**

Enter the port number for the PostgreSQL Server. The default Port number is 5432.

**Database**

Enter the database name that will be used for Bot Insight. By default, the database name is zoomdata.

**Use Secure Connection**

Select this option if your PostgreSQL Server database uses a secure connection.

**Username**

Enter the user name for the PostgreSQL Server database. The default username is postgres.

This user must have Database Owner (DBO) permissions.

**Password**

Enter the password for the PostgreSQL Server database.

**Confirm Password**

This is only visible when the Install PostgreSQL option is selected.

Note: If PostgreSQL Server option is selected, the Hostname and Use Secure Connection fields are disabled and set to default values.

- Microsoft SQL Server

Microsoft SQL Server is the default metadata database type and the default name is set to BIVisualization. You can opt to change the database name.

Note: Along with the BIVisualization database, three other databases, BIVisualization-keyset, BIVisualization-scheduler, BIVisualization-upload, are created by default for storing dashboard configuration information.

16. Click Next.

The Ready to Install the Program screen appears.

17. Click Install and allow the installation process to complete.

The InstallShield Wizard Completed screen appears.

18. Click Finish.

Launch Automation Anywhere is enabled by default.

The Enterprise Control Room launches in your default browser with the Configure Enterprise Control Room settings page displayed.

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

Continue to [Customize settings post-installation on Google Cloud Platform](#).

## Customize settings post-installation on Google Cloud Platform

After installation is complete, configure Enterprise Control Room settings on Google Cloud Platform.

### Prerequisites

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

### Procedure

1. Enter the SVN Repository path.

This is the location where the uploaded automation files, for example, MetaBots, IQ Bots, and TaskBots are stored.

2. Enter the F5 URL in the Enterprise Control Room URL field.

This is the URL for accessing your installation of Enterprise Control Room.

3. Click Save and continue.

Warning: The back button of your [web browser](#) automatically disables 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+F5**

and restart.

The Credential Vault settings page appears.

4. Select the Manual mode option.

With this option, 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.

5. Click Save and continue.

Warning: The back button of the [web browser](#) automatically disables 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.

6. Select the Active Directory option.

7. Type the Domain username.

Ensure you use the User Principal Name (UPN) in the `username@domain.com` format.

The username you enter must be for a user who has access to all domains using the same credentials.

8. 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.

9. 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.
10. Select the domains and sites to use for authentication.  
Select a minimum of one site per domain.
  11. Click Check connection.  
  
If Enterprise Control Room is unable to connect to the Active Directory database, an error message appears.
  12. Click Next.  
The Enterprise Control Room first administrator page appears.
  13. Select the Active Directory domain from the drop-down list and type the Enterprise Control Room administrator username.
  14. Click Check name in Active Directory.  
If the username is in the Active Directory the following user details are shown:
    - First name
    - Last name
    - EmailYou can edit these prepopulated fields.

15. 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. Proceed to [Installing a license](#).

## Installing Enterprise Control Room using scripts

Silent Enterprise Control Room installation, also known as unattended installation, uses a customized Powershell 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

- Review [Automation Anywhere Enterprise architecture](#).
- Verify [Enterprise Control Room prerequisites](#).
- Ensure that you have:
  - 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
INSTALLDIR	Installation Directory
AA_SETUPTYPE	Setup type Custom or Express
AA_SETCLUSTERMODE	For cluster set 1 else 0
AA_CRCLUSTERCONFIG	if AA_SETCLUSTERMODE=1 then cluster IP comma separated
AA_CRLISTENPORT	Web server port. Default value is 80
AA_CRFORCETOHTTPS="1"	Force traefik from HTTP to HTTPS
AA_CRFORCEHTTPSCONFIG=" "	-
AA_CRWCCERTPASSWD	Certificate password
AA_CRSETLOCALSERVICECRED	1 if service logon as System 0 if service logon as specific user
AA_CRSERVICEUSERNAME	if AA_CRSETLOCALSERVICECRED= 0 then domain\user name
AA_CRSERVICEPASSWD	if AA_CRSETLOCALSERVICECRED= 0 then password
AA_CRSERVICECONFIRMPASSWD	if AA_CRSETLOCALSERVICECRED= 0 then confirm password

Enterprise Control Room installation parameters	
Variable Name	Description
AA_CRDBPORT	Enterprise Control Room database port. Default value is 1433
AA_SQLSERVERAUTHTYPE	0 for Windows Authentication and 1 for SQL Server Authentication
AA_CRWCCERTPATH	Certificate path
IS_SQLSERVER_SERVER	SQL server name (host name)
IS_SQLSERVER_AUTHENTICATION	0 for Windows authentication
AA_SQLSERVERAUTHMODE	0 for Windows authentication
IS_SQLSERVER_DATABASE	SQL Database name
IS_SQLSERVER_DATABASE1	BotInsight database name
AA_BIPGINSTALL	1 if Install PostgreSQL else 0
AA_INSTALLPOSTGRES	Install PostgreSQL Server
AA_BIPGDATABASE	PostgreSQL database name
AA_BIPGHOSTNAME	PostgreSQL hostname (Server name)
AA_BIPGUSERNAME	PostgreSQL username

Enterprise Control Room installation parameters	
Variable Name	Description
AA_BIPGPASSWORD	PostgreSQL password
AA_BIPGCONFIRMPASSWORD	PostgreSQL confirm password
AA_CRHTTPPORT	CR HTTP port. Default is 5432
AA_CRHTTPSPORT	CR HTTPS port
Oracle Related Parameters	
AA_ENTERPRISEDBTYPE	1 for Oracle
AA_ORCLDATABASESERVER	Oracle database server
AA_ORCLJDBC_DRIVERLIB	full path to oracle jdbc driver library
AA_ORCLDATABASEPORT	Oracle Port number (default is 1521)
AA_ORCLSID	System identifier that identifies each Oracle database instance
AA_ORCLCRUSERNAME	Oracle Enterprise Control Room username
AA_ORCLCRPASSWORD	Oracle Enterprise Control Room password
AA_ORCLBIUSERNAME	Oracle Bot Insight username
AA_ORCLBIPASSWORD	Oracle Bot Insight password
Elasticsearch Related Parameters	
AA_ELASTICSEARCHSYSIP	valid IP
BotInsight Metadatatype Parameters	
AA_BIMETADATADBTYPE	<0 or 1> 0 is for SQL Server, 1 is for PostgreSQL. If Metadatadbtype is 1 provide the Postgres related details. By default SQL Server Metadata is selected

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 Microsoft SQL Server script.

```
$cr_port=80
$service_username= ".\Administrator"

#e.g."mydomain\john.smith"
$service_pwd="astrongpassword"

##$certpath = "C:\SilentInstall\certificate.pfx"

##$certpass = "changeit"

$db_server="localhost\sqlexpress"
$cr_db_name="CRDB-NEW"
$bi_db_name="BotInsight"
$db_user="sa"
$db_pwd="Admin@123"
$AA_BIMETADATADBTYPE=0
$bi_pg_server="localhost"
$bi_pg_username="automation"
$bi_pg_pwd="Automation123"
$installation_path="C:\Program Files\Automation Anywhere"

#Install latest setup
$static_installation_path="\Enterprise\"#####
$silent_details=" /s ","v"" -join "/"
$installpath_details= "/qn INSTALLDIR=\"\""
$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"
$db_details=" /vAA_BIMETADATADBTYPE=$AA_BIMETADATADBTYPE /vAA_SQLSERVERAUTHTYPE=true
/vIS_SQLSERVER_SERVER=$db_server /vIS_SQLSERVER_USERNAME=$db_user
```

```

/vIS_SQLSERVER_PASSWORD=$db_pwd /vIS_SQLSERVER_DATABASE1=$bi_db_name
/vIS_SQLSERVER_DATABASE=$cr_db_name /vIS_SQLSERVER_AUTHENTICATION=1
/vAA_SQLSERVERRAUTHMODE=1"

$pg_details=" /vAA_BIPGINSTALL=1 /vAA_INSTALLPOSTGRES=0 /vAA_BIPGHOSTNAME=
$bi_pg_server
/vAA_BIPGUSERNAME=$bi_pg_username /vAA_BIPGPASSWORD=$bi_pg_pwd
/vAA_BIPGCONFIRMPASSWORD=$bi_pg_pwd"
$other=" /vAA_CRWCHTTPPORT=80 /vAA_CRWCHTTPSPORT=443 /vAA_CRSELFSIGNCERT=
1
/vAA_CRWCCERTPATH=$certpath /vAA_CRWCCERTPASSWD=$certpass /vLAUNCHPROG
RAM=1
/v"""/LIweamoruc! log.txt"""

$final_commandline = -join($silent_details,$installpath_details,$installat
ion_path,
$static_installation_path,$custom_details,$port_cluster_details,$servi
ce_details,
$db_details,$pg_details,$other)
Write-Host $final_commandline
$a=Get-ChildItem $PSScriptRoot\* -Include *.exe

#$a = "C:\Silent\AutomationAnywhereEnterprise_v11_2_0-07272018-10234948.ex
e"

Write-Host $a
Write-Host "Starting the installation. This could take some time..."
$processdetail=(Start-Process -FilePath $a -ArgumentList $final_commandlin
e
-Wait -PassThru).ExitCode
Write-Host $a.Name execution is done. If installation is not proper please
check msi logs in the temp folder.

pause

```

3. Option: Edit the sample script to use an Oracle Database database.

Use the script to install the Enterprise Control Room with the configuration options available in the installer.

```

$cr_port=80

$service_username= ".\Administrator"
#e.g."mydomain\john.smith"
$service_pwd="astrongpassword"

$cr_db_name="CRDB-NEW"
$bi_db_name="BotInsight"

$OracleServer = "oracledb"
$OraclLib=".\\Oracle\\ojdbc7-12.1.0.2.0.jar"
$ORCLDATABASEPORT=1521
$ORCLSID="ORCL"
$ORCLCRUSERNAME="CR"
$ORCLBIUSERNAME="BI"
$ORCLPASSWORD="Abcd1234"
$AA_ENTERPRISEDBTYPE=1
$AA_BIMETADATADBTYPE=1

$bi_pg_server="localhost"
$bi_pg_username="automation"
$bi_pg_pwd="Automation@123"

$installation_path="C:\\Program Files\\Automation Anywhere"
$static_installation_path="\Enterprise\\\""""
$silent_details=" /s ","v"""" -join "/"
$installpath_details= "/qn INSTALLDIR=\\""""
$custom_details=" /vAA_SETUPTYPE=Custom /vAA_CUSTOMMODETYPE=1" /vDONOTABORT=1
$port_cluster_details=" /vAA_SETCLUSTERMODE=0 /vAA_CRLISTENPORT=$cr_port"

$service_details=" /vAA_CRSETLOCALSERVICECRED=1"
#$service_details=" /vAA_CRSETLOCALSERVICECRED=0
    /vAA_CRSERVICEUSERNAME=$service_username /vAA_CRSERVICEPASSWD=$service_
pwd
    /vAA_CRSERVICECONFIRMPASSWD=$service_pwd"

```

```

##$db_details="/vAA_SQLSERVERAUTHTYPE=true /vIS_SQLSERVER_SERVER=$db_server /vIS_SQLSERVER_DATABASE=$cr_db_name /vIS_SQLSERVER_DATABASE1=$bi_db_name /vIS_SQLSERVER_AUTHENTICATION=1 /vAA_SQLSERVERAUTHMODE=1"
$db_details="/vAA_ENTERPRISEDBTYPE=$AA_ENTERPRISEDBTYPE /vAA_BIMETADATADBTYPE=$AA_BIMETADATADBTYPE /vAA_ORCLDATABASESERVER=$OracleServer
/vAA_ORCLJDBC_DRIVERLIB=$OraclLib /vAA_ORCLDATABASEPORT=$ORCLDATABASEPORT
/vAA_ORCLSID=$ORCLSID /vAA_ORCLCRUSERNAME=$ORCLCRUSERNAME
/vAA_ORCLCRPASSWORD=$ORCLPASSWORD /vAA_ORCLBIUSERNAME=$ORCLBIUSERNAME
/vAA_ORCLBIPASSWORD=$ORCLPASSWORD"

$pg_details="/vAA_BIPGINSTALL=1 /vAA_INSTALLPOSTGRES=0
/vAA_BIPGHOSTNAME=$bi_pg_server /vAA_BIPGUSERNAME=$bi_pg_username
/vAA_BIPGPASSWORD=$bi_pg_pwd /vAA_BIPGCONFIRMPASSWORD=$bi_pg_pwd"

$other="/vAA_CRWCHTTPPORT=$cr_port /vAA_CRWCHTTPSPORT=443 /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_v11_3_1-11142018-06274507.exe"
"

Write-Host $a
Write-Host "Starting the installation please wait for sometime..."

$processdetail=(Start-Process -FilePath $a -ArgumentList $final_commandline -Wait -PassThru).ExitCode

```

```

Write-host $final_commandline"
Write-host $processdetail"
Write-Host "$a.Name execution is done. If installation is not proper please check msi logs in the temp folder"

pause

```

4. Save the script you edit to the server for installation.
5. On the installation server, logged on as an Administrator, open Powershell in admin mode and execute:

```
Set-ExecutionPolicy Unrestricted -Scope CurrentUser
-Force
```

6. 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.

7. Option: Install a hot fix patch of Enterprise Control Room in silent mode.

- a) Ensure the Powershell script is located in the same directory as the Enterprise Control Room installer.

- b) Launch the Windows command window in administrator mode.

- c) Change to the directory where the installation files are stored.

- d) Run the Enterprise Control Room installer.

```
C:\Setup>
```

```
./"Automation Anywhere
```

```
Enterprise_Update_11.3.x.x.exe" /s /v/qn
```

- e) View installation progress. From the Enterprise Control Room, select Task ManagerBackground processes.

The machine restarts when installation is complete.

## 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, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

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

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

Prepare for users.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user.

Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

## Enterprise client installation

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

# Enterprise Control Room post-installation configuration

After installing the Enterprise Control Room, complete the configuration settings to ensure timely Automation Anywhere communications are specified, confirm Automation Anywhere services are running, configuring the Access Manager reverse proxy and Enterprise Control Room authentication options, and installing a license.

- [Configuring post installation settings](#)

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings ensure timely Automation Anywhere communications.

- [Verifying Automation Anywhere Windows services](#)

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

- [Configuring 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.

- [Configuring 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.

- [Configuring Access Manager Reverse Proxy](#)

Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room.

- [Configuring for IQ Bot versions](#)

For selected versions of IQ Bot you need to adjust configuration in the `cluster.properties` file.

Add `ignite.security.disable` and/or `ignite.tls.disable` parameters, as needed.

## Related concepts

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

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

[Installing Enterprise Control Room on Amazon Web Services](#)

## Related tasks

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

[Installing Enterprise Control Room using scripts](#)

## Related reference

[Enterprise Control Room pre-installation](#)

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

## Configuring post installation settings

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings 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.

From Windows, select Control Panel > Region > Administrative > Change system locale.

### Set the Region

Select English (United States) as the Region Format.

From Windows, select Control Panel > Region > Format.

### Set Time synchronization

Enable Network Time Protocol (NTP) on both the Enterprise Control Room and Enterprise client. For additional information about setting the NTP, contact your system administrator.

### For Microsoft Azure platform installation

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, Subversion Version Control and SMTP settings.

### Related reference

[Verifying Automation Anywhere Windows services](#)

[Working with SQL Servers](#)

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

[Enterprise client post-installation configuration](#)

## Verifying Automation Anywhere Windows services

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

### To verify installed Windows services

From your Windows device:

1. Select Control Panel > Administrator Tools > Services.

The specific path to Services can vary, depending upon your specific Windows version.

2. Scroll through the list to find the listed service name. Note the Status.

## Enterprise Control Room Windows services

Verify that the following Windows services are installed by the Automation Anywhere Enterprise Control Room installer.

Service Name	Description
Automation Anywhere Bot Insight EDC	Used to extract data from Automation Anywhere databases to create dashboards.
Automation Anywhere Bot Insight Elastic Search	Enterprise connector to pull data from Elasticsearch based data source into the dashboard.
Automation Anywhere Bot Insight <a href="#">PostgreSQL Server</a>	PostgreSQL database server for use by Automation Anywhere.
Automation Anywhere Bot Insight Query Engine	Controls and manages queries, including all filtering and data manipulation on the dashboard.
Automation Anywhere Bot Insight Scheduler	Periodically updates Automation Anywhere dashboards. This service connects to the Bot Insight Visualization service to update the database.
Automation Anywhere Bot Insight Service	Receives and processes API requests for Bot Insight.
Automation Anywhere Bot Insight Service Discovery	Provides the ability for Bot Insight services to find each other.
Automation Anywhere Bot Insight Visualization	Renders service requests for dashboards within the Bot Insight application. Any request that pertains to adding, configuring, or deleting widgets goes through this service.
Automation Anywhere Control Room Caching	Used for distributed cache storage.
Automation Anywhere Control Room Messaging	Allows Enterprise Control Room services to communicate asynchronously.

Service Name	Description
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 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 more information, Elasticsearch documentation can be found <a href="#">here</a> .
Automation Anywhere Licensing	Manages licensing information for Automation Anywhere products and services.

Note: All the services can be configured either in Local System or Domain account when the Enterprise Control Room is installed in Custom mode. For a Enterprise Control Room installed in Express mode, all the services are run in Local System account.

## Enterprise client Windows services

Verify that the following Windows services are installed by the Enterprise client installer.

Service	Description
<a href="#">AAAutoLoginService</a> , Automation Anywhere Enterprise Auto Login Service	This service provides support for automatic login functionality in the .
<a href="#">AAClientService</a> , Automation Anywhere Enterprise Client Service	This service provides support for the client services functionality in theEnterprise client.
<a href="#">AAESchedulerService</a> , Automation Anywhere Enterprise Scheduler Service	This service provides support for Scheduling functionality in the Enterprise client.

Related concepts

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

Related tasks

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

## Configuring 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.

Transportation Layer Security is configured as part of Enterprise Control Room [Installing Enterprise Control Room using Custom mode](#). If that step is skipped or the certificate expires, setup a self-signed certificate in the post-installation 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 [configuring the Control Room](#), or if you have already configured it, [log on to the Control Room](#).

- [Import certificate for HTTPS](#)  
After installing Enterprise Control Room, import a certificate for HTTPS using the command prompt.

#### Related tasks

[Import a CA certificate](#)

#### Related reference

[Configuring Enterprise Control Room authentication options](#)

### Import certificate for HTTPS

After installing Enterprise Control Room, import a certificate for HTTPS using the command prompt.

To import a certificate for configuring the Enterprise Control Room for secure connection using the command prompt, do the following steps:

### Procedure

1. Run the command prompt in administrator mode.
2. Copy the Automation Anywhere installation path.  
The default installation path is C:\Program Files\Automation Anywhere\Enterprise.
3. Type or paste the following command in the prompt:

```
jre\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -setServerCert "C:\Users\cradmin\Desktop\test_automationanywhere_com.pfx" -privateKeyPass YhjR35@#Mkjde
```

## Configuring 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, Single Sign-On, or HTTPS self-signed certificate.

- [Configuring Enterprise Control Room Express mode authentication](#)

After completing the installation in Express Mode, configure the Enterprise Control Room in Express Mode using the default settings.

- [Configuring 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.

- [Configuring 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.

- [Configuring Enterprise Control Room for Enterprise Control Room database](#)

Configure the Enterprise Control Room to authenticate users using the database option.

- [Configuring Enterprise Control Room for Single Sign-On](#)

Configure the Enterprise Control Room to authenticate users at login using the Single Sign-On option through either identity provider (IdP) Okta or SSOCircle, using Security Assertion Markup Language (SAML) 2.0 protocol.

## Configuring Enterprise Control Room Express mode authentication

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:

### Procedure

1. Double-click the Automation Anywhere Enterprise Control Room icon on the desktop.

The Getting Started wizard appears.

2. Fill in the following fields:

- Username Supply a user name.
- First name Enter the first name.
- Last name Enter the last name.
- Email Supply email address.
- Password Enter a password.

- Confirm password Type the password again to confirm.
3. Click Next.  
The Create security questions page appears.
  4. Type 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. Proceed to [Installing a license](#).

### Related reference

[Custom Enterprise Control Room configuration](#)

## Configuring 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:

## 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, MetaBots, IQ Bots, and TaskBots are stored. For example, C:\ProgramData\AutomationAnywhere\Server Files.

3. Type 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](#) automatically disables 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+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](#) automatically disables 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.

Starting from Version 11.3, 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.
- **11.3.1** 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 LDAP URL.

For example, `ldap://server01.domain.com`.

To support users from a domain for a different forest, click the + 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).

If you add a domain or a subdomain, the authentication fails. For example, use `ldap://Server01.ldap.com` instead of `ldap://MyDomain/`.

**11.3.1** Starting with 11.3.1, 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.

**11.3.2** Starting with Version 11.3.2, you must enter the Domain username and password and click Manually add connections to enter the LDAP URLs.

9. Type the username.

Ensure you use the User Principal Name (UPN) in the `username@domain.com` format.

10. Type the password.

This must be a domain user in the Domain Users' group. However, this user is not expected to use the Enterprise Control Room. Although you have an option to update the password, use an account with a password never expires option. If the password expires, it can be updated, but with some downtime.

11. Click Check connection.

If Enterprise Control Room is unable to connect to the Active Directory database, an error message appears.

**11.3.2** In Version 11.3.2, click Test connections to register the sites to use for authentication.

12. Click Next.

The Enterprise Control Room first administrator page appears.

13. Select the Active Directory domain from the drop-down list and type the Enterprise Control Room administrator username.

14. 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.

15. 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. Proceed to [Installing a license](#).

### Related concepts

[Configure Enterprise Control Room for Single Sign-On](#)

### Related tasks

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

[Configuring Enterprise Control Room for Enterprise Control Room database](#)

## Configuring Enterprise Control Room for Active Directory: auto mode

**11.3.2** 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:

## Procedure

- Double-click the Automation Anywhere Enterprise Control Room icon on your desktop.

The Configure Enterprise Control Room settings page appears.

- Type the repository path.

This is the location where the uploaded automation files, for example, MetaBots, IQ Bots, and TaskBots are stored. For example, C:\ProgramData\AutomationAnywhere\Server Files.

- Type the access URL.

This is the URL for accessing your installation of Enterprise Control Room.

- Click Save and continue.

**Warning:** The back button of your [web browser](#) automatically disables 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+F5**

and restart.

The Credential Vault settings page appears.

- 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.

- Click Save and continue.

**Warning:** The back button of the [web browser](#) automatically disables 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.

- Select Active Directory.

Starting from Version 11.3, 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.
- 11.3.1** 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 must be 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 a minimum of one site per domain.

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.

**11.3.2** In Version 11.3.2, click Test connections to register the sites to use for authentication.

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 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. Proceed to [Installing a license](#).

### Related concepts

[Configure Enterprise Control Room for Single Sign-On](#)

### Related tasks

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

[Configuring Enterprise Control Room for Enterprise Control Room database](#)

### Related reference

[Guidelines to set up service users for auto discovery mode](#)

## Configuring Enterprise Control Room for 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:

## 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, MetaBots, IQ Bots, and TaskBots are stored. For example, C:\ProgramData\AutomationAnywhere\Server Files.

3. Type 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](#) automatically disables 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+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](#) automatically disables 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 the Enterprise Control Room database.

8. Click Next.

The Enterprise Control Room first administrator page appears.

9. Fill in the following fields:

- Username Supply a user name.
- First name Enter the first name.
- Last name Enter the last name.
- Email Supply email address.
- Password Enter a password.
- Confirm password Type the password again to confirm.

10. Click Next.

The Create security questions page appears.

11. Type 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

After configuring the Enterprise Control Room, install product licenses. Proceed to [Installing a license](#).

### Related tasks

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

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

[Configuring Enterprise Control Room for Single Sign-On](#)

## Configuring Enterprise Control Room for Single Sign-On

Configure the Enterprise Control Room to authenticate users at login using the Single Sign-On option through either identity provider (IdP) Okta or SSOCircle, using Security Assertion Markup Language (SAML) 2.0 protocol.

## Prerequisites

Before starting with the Enterprise Control Room configuration, set up your SAML application:

### Okta

For more information, see [Setting up a SAML application in Okta](#).

During setup ensure that you:

- Type the Single Sign-On URL as `http://<your-server>/v1/authentication/saml/assertion`. Replace `<your-server>` with the location where your Enterprise Control Room instance runs.

For example, `http://localhost:8080/v1/authentication/saml/assertion`, where `http://localhost:8080` is the Enterprise Control Room access URL.

- Provide these four Attribute Statements: UserID, FirstName, LastName, and EmailAddress.
- Save the Identity Provider metadata XML file. You need this to complete step 8.
- Note the Audience URI (SP Entity ID). You need this to complete step 9.

### SSOCircle

For more information, see [Setting up a SAML application in SSOCircle](#).

During setup ensure that you:

- Register and log in as an admin or a user with permission to add a service provider.
- Save the Identity Provider metadata XML file. You need this to complete step 8.

To configure the Enterprise Control Room when you start it for the first time:

## 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, MetaBots, IQ Bots, and TaskBots are stored. For example, C:\ProgramData\AutomationAnywhere\Server Files.

3. Type 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](#) automatically disables 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+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](#) automatically disables 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 Single Sign-On (SAML 2.0).

8. Copy and paste the SAML Metadata from the Identity Provider metadata XML file you created when configuring your SAML application.

9. Provide the Unique Entity ID for Enterprise Control Room.

The ID is the same as Audience URI that you provided when configuring your SAML application.

10. Optional: Select Encrypt SAML Assertions for enhanced security

Ensure you are using the X509 Certificate format and PKCS #8 format for public and private key respectively.

Note: You must provide the certificate of the service provider, in this case the Enterprise Control Room, and not the Identity Provider's certificate.

11. Click Next.

The Registering Control Room panel appears.

Follow the steps to register the Enterprise Control Room as a service provider.

12. Click Authenticate with IdP.

On successful authentication, the user is added to the Enterprise Control Room and the Enterprise Control Room first administrator page appears with the Username, First name, Last name, and Email fields prepopulated.

13. 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. Proceed to [Installing a license](#).

- [Configure Enterprise Control Room for Single Sign-On](#)

Use the Single Sign-On (SSO) option to enable the Enterprise Control Room authentication through an identity provider (IdP), using Security Assertion Markup Language (SAML) 2.0 protocol.

Related tasks

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

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

[Configuring Enterprise Control Room for Enterprise Control Room database](#)

## Configure Enterprise Control Room for Single Sign-On

Use the Single Sign-On (SSO) option to enable the Enterprise Control Room authentication through an identity provider (IdP), using Security Assertion Markup Language (SAML) 2.0 protocol.

An identity provider (IdP), for example, Okta or SSOCircle, is a third-party service that authenticates credentials to enable access to multiple applications including the Enterprise Control Room.

Select the authentication type as Single Sign-On when you configure the Enterprise Control Room for the first time and configure an IdP for authentication. Every time a user tries to log in to the Enterprise Control Room, the request is redirected to the IdP for authentication.

## Configuring Access Manager Reverse Proxy

**11.3.2** Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room.

### Reverse proxy server prerequisites

- Install Automation Anywhere Enterprise Version 11.3.2 or later. This includes both Enterprise client and Enterprise Control Room.
- Ensure a Microsoft Windows user Trusted Client Certificate exists for every Enterprise client user. The user-specific certificate establishes that user as a trusted user.
- Install the Trusted Client Certificate on every machine running the Enterprise client.

Store the certificate in Microsoft Windows certificate store > Personal > Current User.

Note: Only IBM WebSEAL is certified for mutual authentication using the Access Manager Reverse Proxy.

## Reverse proxy server process

1. The first request from the Enterprise client to the Enterprise Control Room is authenticated by the Reverse Proxy server using the Client Certificate mechanism.
2. The Reverse Proxy server returns the response with a cookie, which is used for all the subsequent requests.
3. Each subsequent user login does not require additional authentication with a certificate. The same cookie is used when:
  - Trusted users change the Enterprise Control Room authentication type.
  - Trusted users switch to another Enterprise Control Room.

### Related tasks

[Logging in to Enterprise client](#)

[Installing the Enterprise client](#)

## Configuring for IQ Bot versions

For selected versions of IQ Bot you need to adjust configuration in the `cluster.properties` file. Add `ignite.security.disable` and/or `ignite.tls.disable` parameters, as needed.

### Procedure

1. Locate the `cluster.properties` file in your Enterprise Control Room directory.

For example, default location is:

```
C:\Program Files\Automation Anywhere\Enterprise\config\
```

If the file does not exist in your Enterprise Control Room directory, create it.

2. Add the following property options to the `cluster.properties` file.
  - For IQ Bot Version 6.5, add `ignite.security.disable=true` and `ignite.tls.disable=true`.
  - For IQ Bot Version 6.5.2, add `ignite.tls.disable=true`
3. Save the `cluster.properties` file.
4. Restart the listed services in the following order:
  - a) Automation Anywhere Control Room Caching
  - b) Automation Anywhere Control Room Messaging
  - c) Automation Anywhere Control Room Service
5. To ensure all the cache are in sync, restart the rest of the Automation Anywhere Windows services and restart the IQ Bot Windows services.  
For a full list of services, see [Verifying Automation Anywhere Windows services](#) and the IQ Bot documentation topic, IQ Bot Windows services.

# Enterprise Control Room post-installation validation

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room and installing a license. First time access to the Enterprise Control Room walks you through configuration for your authentication method.

- **Installing a license**

A Enterprise Control Room administrator or a user with license management permission can install a license and evaluate the latest version.

- **Preparing for users**

After completing Enterprise Control Room installation and post-installation configuration and validation, you are ready to prepare for users to login and install the Enterprise client.

Related concepts

[Installing Enterprise Control Room on Amazon Web Services](#)

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

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

Related tasks

[Installing Enterprise Control Room using scripts](#)

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

Related reference

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

[Enterprise Control Room pre-installation](#)

## Installing a license

A Enterprise Control Room administrator or a user with license management permission can install a license and evaluate the latest version.

A [Trial license](#) is valid for 30 days. Once it expires, you cannot access the Enterprise Control Room. Contact the System Administrator or Automation Anywhere Sales to purchase a new license. To install a license:

## Procedure

1. Login to the Enterprise Control Room as an Administrator, and select Administration > Licenses.
2. Click Install license or you can click Show details on the notification bar in the Enterprise Control Room header, then click Install a new license.
3. Click Browse to select a .license file from the list of licenses.
4. Click Install license.  
An error occurs when:
  - A user has an invalid or an expired license file.
  - A user selects a file with a different extension other than .license.
  - A user selects a file that has been deleted or moved to another location.

## Next steps

Enterprise Control Room installation and configuration is complete. Proceed to [Preparing for users](#).

- [Trial license](#)

Automation Anywhere Enterprise Control Room ships trial License with an evaluation period of 30 days. Use a trial license to assess the product and make an informed purchasing decision.

- [How to change license service port](#)

The Automation Anywhere Enterprise Control Room default license service port is 8080. If the port is busy or blocked, for example, due to a firewall between the license server and clients, you have the option to change the license service port.

Related concepts

[Licenses - an overview](#)

Related tasks

[Logging in to Enterprise client](#)

Related reference

[Trial license](#)

## Trial license

Automation Anywhere Enterprise Control Room ships trial License with an evaluation period of 30 days. Use a trial license to assess the product and make an informed purchasing decision.

Trial license offers 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 Adminstrator. 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.

Related tasks

[Install a new license](#)

## How to change license service port

The Automation Anywhere Enterprise Control Room default license service port is 8080. If the port is busy or blocked, for example, due to a firewall between the license server and clients, you have the option to change the license service port.

## Prerequisites

Stop the following Automation Anywhere Enterprise Control Room services, before you change the Enterprise Control Room license service port:

- Automation Anywhere Control Room Caching
- Automation Anywhere Licensing

- Automation Anywhere Control Room Service

This process requires downtime. During the downtime, clients are not accessible.

To change the license service port:

## Procedure

1. From the Enterprise Control Room, logged on as an Administrator, navigate to Program Files > Automation Anywhere > Enterprise > service.
2. Open the AutomationAnywhere.Controlroom.Service.exe file in the text editor program.
3. Modify the port number in the following tag:  
`<add key="BaseUrl" value=http://localhost:8080/>`
4. Save the file.
5. Navigate to Program Files > Automation Anywhere > Enterprise > config.
6. Open the license.properties file in the text editor program.
7. Configure the same port number in the following tag:  
`license.serviceurl=http://127.0.0.1:8080/license/decrypt`
8. Save the file.
9. Start the following Automation Anywhere Enterprise Control Room services in the listed sequence.  
Wait for an interval of 30 seconds before starting the next service.
  - a) Automation Anywhere Control Room Caching
  - b) Automation Anywhere Licensing
  - c) Automation Anywhere Control Room Service

Related concepts

[Licenses - an overview](#)

## Preparing for users

After completing Enterprise Control Room installation and post-installation configuration and validation, you are ready to prepare for users to login and install the Enterprise client.

### [User management overview](#)

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

### [Enterprise client installation](#)

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

## Upgrade to a higher 11.x version

Upgrade from the current version of Enterprise Control Room to a higher version using the Enterprise Control Room installer.

You are notified through A-people when Automation Anywhere releases an upgrade. There are two types of Enterprise Control Room upgrades. The differences are as follows:

## Major upgrade

A major upgrade offers new features. It is not necessary to uninstall the old version.

Run the complete setup to configure all the Enterprise Control Room parameters in the installer. See [Major Upgrade](#) for instructions.

## Patch fix

A patch fix is a maintenance upgrade to correct bugs. In order to install a patch fix, you must have the most recent base version installed.

[11.3.1.1](#) [11.3.1.4](#) Run the patch fix installation file to apply specific fixes to the Enterprise Control Room features. See [Patch Fix](#) for instructions.

## Related concepts

[Postupgrade checklist](#)

## Related tasks

[Pre-upgrade checklist](#)

[Postupgrade configuration of Active Directory](#)

## Pre-upgrade checklist

Before upgrading the Enterprise Control Room, complete your backups, replace the binaries, compare and verify data, take a screen shot, and complete other required verifications to ensure business continuity.

## Procedure

1. Plan an upgrade activity when the server is exposed to a minimal load for cluster deployment (High-Availability Enterprise Control Room).  
Stop all Enterprise Control Room services before starting the installation.
2. Ensure the work items for all active automation tasks are processed.  
Verify that the number of pending work items in Activity > In progress > View activity in the Enterprise Control Room.  
Tip: If there are pending work items in Workload Management during upgrade then run following query to troubleshoot this situation: `UPDATE WORKITEMS SET STATUS = 'ERROR' WHERE STATUS = 'QUEUED'`
3. Back up the following:
  - Enterprise Control Room and Bot Insight databases.
  - Enterprise Control Room repository.
  - Credential Vault Master Key.
  - Installation files: (default locations)

C:\Program Files\Automation Anywhere

C:\ProgramData\AutomationAnywhere

4. Take a screen shot of the Enterprise Control Room Dashboard.

For updates that are allowed or not allowed to the configuration, see table:

Table 1.

Allowed	Not allowed
Installation path	Installation Type Preference
Cluster Configuration	Enterprise Control Room database type

Allowed	Not allowed
Database Server	Bot Insight Metadata Database type
Database Names	-
Port numbers	-

5. To get an updated LDAP page: Reset the Service User credentials that were expired or disabled. In this case, the Enterprise Control Room Login page will not show domains in the drop-down list.
  - Stop the Enterprise Control Room Caching and Enterprise Control Room Service on all the other nodes in the cluster environment.
  - Provide a Enterprise Control Room admin user in the username field in the format <domain\user> and <password>.
  - An LDAP updated page is shown for new LDAP URLs and Service User credential.  
Note: If the LDAP updated page does not display, clear the browser cache. See [Enterprise client known limitations](#).
6. Re-enable the existing Service User and update the URLs.  
Important: For customers using updated LDAP URLs and Service User, ask your [Active Directory](#) Administrator to expire or disable existing Service User after the Enterprise Control Room is installed.
7. Add the below paths to the anti-virus exclusion list:
  - C:\Users\UserProfile
  - C:\ProgramFiles\Automation Anywhere

## Major Upgrade

Run a major upgrade installation to access the newest version of Automation Anywhere. It is not necessary to remove the old file; the process completely removes the old version, then guides you through installing and configuring the new version.

### Prerequisites

Before starting the upgrade process, complete the steps in the [Pre-upgrade checklist](#).

### Procedure

1. Run the Version 11.3 Enterprise Control Room installer.  
An upgrade message appears.
2. Click Yes to continue.
3. Follow the steps in the Automation Anywhere setup wizard.  
Provide the configuration parameters on each screen of the installer and verify that the configuration parameters are the same as in the previous 11.x installation. If you are unsure about the exact configuration parameter values, see the aae-installsummary.html file in the 11.x installation folder.  
For more information, see [Installing Enterprise Control Room using Express mode](#) or [Installing Enterprise Control Room using Custom mode](#).
4. Configure Enterprise Control Room settings.  
For more information, see [Configuring Enterprise Control Room authentication options](#).

If you are using LDAP authentication on multiple nodes, see [Postupgrade configuration of Active Directory](#) for the steps to change the active directory configuration.

5. Click Finish.
6. Verify that the Enterprise Control Room is properly installed using the [Postupgrade checklist](#).

Related concepts

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

Related tasks

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

[Postupgrade configuration of Active Directory](#)

Related reference

[Configuring Enterprise Control Room authentication options](#)

## Patch Fix

Run a patch fix installation to access updates to the current version of Automation Anywhere.

### Prerequisites

Ensure that the most recent base version of the patch fix is installed. For example, before upgrading to Version 11.3.1.4 patch, install Version 11.3.1.

If you have updated any binaries in the installation folder, then replace them with original binaries before upgrading to a new patch.

Verify the following during the patch upgrade:

Standalone mode	Cluster mode
Enterprise clients are disconnected and none of the local schedule will run on the Enterprise client or from the Enterprise Control Room.	Enterprise clients are not disconnected and both types of schedules are run.
Downtime for the Enterprise clients and the Enterprise Control Room before the patch upgrade is required.	<p>No downtime is required but have a minimal load on the Enterprise Control Room servers at the time of the patch upgrade, which means:</p> <ul style="list-style-type: none"> <li>• All the Enterprise clients are connected.</li> <li>• No upload or download activity from Enterprise client to Enterprise Control Room can occur.</li> <li>• A minimum number or no schedules are run from the Enterprise Control Room</li> </ul>
Must re-login to all the Enterprise clients after patch upgrade to continue with business as usual.	The Enterprise clients are connected during patch upgrade so relogin is not required.

## Procedure

1. Run the 11.x patch setup in Run as Administrator mode.
2. In the Welcome screen, click Update.
3. Click Finish.
4. Verify that the Enterprise Control Room is properly installed using the [Postupgrade checklist](#).

## Next steps

### Postupgrade checklist

**11.3.1.1** After upgrading the Enterprise Control Room, verify that it installed as expected to ensure business continuity. Log in to the Enterprise Control Room and Enterprise client. Compare the settings, audit logs, dashboards, users, and bots repository. Upload/download bots and Schedule/Run TaskBots from Enterprise Control Room/Enterprise clients.

### Verify Automation Anywhere Enterprise Control Room scenarios

1. Log in to the Enterprise Control Room as an Admin user.
2. Go to the Audit Log and verify an audit entry `Credential Vault connected successfully` exists.
3. Verify that all postupgrade settings in Administration > Settings are identical to the preupgrade settings.
4. Log in to all the required Automation Anywhere Enterprise clients individually.
5. Verify that the same Enterprise clients are displayed online in the Users page of the Enterprise Control Room Administration tab.
6. Verify that the preupgrade Dashboards for bots and Devices are identical.

If the Enterprise Control Room is installed in a Cluster mode, verify the Load Balancer URL:

1. Since the Application Server is offline for the upgrade due to the recommended sticky session in Load Balancer (LB), close the browser in which the current Enterprise Control Room session is running and relaunch it.
2. Log in to the Enterprise Control Room as an admin user to compare the Enterprise Control Room Dashboard with the screenshot taken during the pre-upgrade, for example, Registered Clients, Active users, Number of folders, and files in the Enterprise Control Room repository. All of these must be identical after the patch upgrade.
3. Go to the Enterprise clients tab and verify the Enterprise clients that are currently online.

### Verify Automation Anywhere Enterprise client scenarios

1. Upload a sample TaskBot and its dependency:
  - a) Log in to the Automation Anywhere Enterprise client using the Bot Creator (Development) license.
  - b) Select a sample TaskBot with a dependency in a different folder.
  - c) Upload the sample from the Enterprise client to the Enterprise Control Room.

The upload successful message appears on the Enterprise client.

- d) Log in to the Enterprise Control Room and verify that the uploaded TaskBot and its dependencies are in the correct folders in the My Task Bots folder on the Bots page.
- e) Verify that the Audit Log message Task <taskname.atmx> uploaded successfully is returned.
- 2. Download a sample TaskBot and its dependency:
  - a) Log in to the Enterprise client using the Bot Creator (Development) license.
  - b) In the Enterprise client, go to the Repository.
  - c) Select a sample TaskBot with a dependency in a different folder from the Server.
  - d) Download the sample from the Server to the Enterprise client.

The download successful message must appear in the Enterprise client.

- e) Verify that the Enterprise client Repository that downloaded the TaskBot and its dependencies are in the correct folders.
- f) Log in to the Enterprise Control Room and verify the Audit Log message Task <taskname.atmx> downloaded successfully is returned.
- 3. Verify a local schedule with auto login on the Enterprise client in Lock mode:
  - a) Log in to the Enterprise client using a Bot Runner (Runtime) license.
  - b) Set the auto login credentials in Tools/Options in the Enterprise client and select the Autologin your computer check box.
  - c) Create a local schedule in the Enterprise client using a sample task.
  - d) Lock the machine.
  - e) Wait until the schedule runs.
    - f) The schedule must run on the local Enterprise client.
    - g) Auto login must work successfully, and the bot Player must be invoked to run the task.

Note: The audit log is not generated for this in the Enterprise Control Room.

- 4. Run (deploy) from the Enterprise Control Room to the Enterprise client:
  - a) Log in to the Enterprise client using a Bot Runner (Runtime) license.
  - b) Set the autologin credentials in Tools > Options in the Enterprise client and select the Autologin your computer check box.
  - c) Lock the machine.
  - d) Log in to the Enterprise Control Room as an admin user.
  - e) Select a sample task and choose the Run option.
  - f) Select the Bot Runner to run the task and click Run.
    - g) The Task <taskname.atmx> deployed successfully on selected Clients message appears in the Enterprise Control Room.
    - h) The same message must be logged and available in the Enterprise Control Room's Audit log.
    - i) The Bot Runner machine must be unlocked using the autologin credential, the bot Player must be invoked, and a task must run.
  - j) Verify in the Enterprise Control Room Activity/In progress page that the task is in progress.
    - k) The bot Player must close after the task completes successfully on the Enterprise client machine and it must return to the locked mode.
    - l) The task in progress entry must not be shown in the Enterprise Control Room Activity/In progress page.
  - m) Verify in the Enterprise Control Room Activity\Historical page that the history of available tasks exists.
  - n) Verify that the task run completion entry exists in the Audit Log as Task <taskname.atmx> completed. Run duration xx:xx:xx.
- 5. Schedule and run from the Enterprise Control Room with autologin on the Enterprise client as follows:
  - a) Log in to the Enterprise client using a Bot Runner (Runtime) license.
  - b) Set the autologin credentials in Tools/Options in the Enterprise client and select the Autologin your computer check box.

- c) Lock the machine.
- d) Log in to the Enterprise Control Room as an Admin user.
- e) Select a sample task and choose the Schedule option.
- f) Select the required options for:
  - g) Schedule name: TestSchedule
  - h) Recurrence: None/Daily/Weekly/Monthly
  - i) Start date: Today's date
  - j) Schedule Time: 10 minutes from the current time.
- k) Select the Bot Runner to schedule the task and click Save.
- l) Wait for the schedule to run on the Bot Runner from the Enterprise Control Room.
  - m) The Schedule <Schedule name> created successfully message appears in the Audit Log page.
  - n) The same schedule must be available in the Scheduled Activity page with the correct Start date/time and Next occurrence date/time.
  - o) The Task <taskname.atmx> of schedule <Schedule name> deployed successfully on: <Host name> message appears in the Audit Log when the schedule runs on the Bot Runner.
  - p) The Bot Runner machine must be unlocked using the auto login credential. The bot Player must be invoked, and a task must run.
  - q) The task in progress message must appear in the Enterprise Control Room Activity/In progress page.
  - r) The bot Player must close on the Enterprise client machine after the task completes successfully and the machine must return to the locked mode.
  - s) The task in progress entry must exist in the Enterprise Control Room Activity/In progress page.
  - t) The history of tasks must be available in the Enterprise Control Room Activity/Historical page.
  - u) The Task run completion entry must appear in the Audit Log as Task <taskname.atmx> completed. Run duration xx:xx:xx.
- v) Verify that the schedule next occurrence is available. If it is available, then it remains visible in the Enterprise Control Room Scheduled activity page.

Tip: Test the schedule and run from the Enterprise Control Room with auto login on the Enterprise client using different types of schedules from the Enterprise Control Room.

## Postupgrade configuration of Active Directory

If you use LDAP authentication on multiple forests, you must do a postupgrade to version 11.3.x Active Directory configuration.

To configure the Active Directory after an upgrade, do the following steps:

### Procedure

1. Launch the Enterprise Control Room.  
The Change Active Directory configuration page appears. If the page does not appear, clear your browser cache and retry.
2. Type your username and password credentials.
3. **11.3.2** Select a connection option:
  - Manually add connections: Type the LDAP URL(s) manually.

For example: `ldap://server01.domain.com`.

- If you use Multi-Forest authentication, use the + sign to add more URLs.
- For more information, see [Configuring Enterprise Control Room for Active Directory: manual mode](#).
- Discover connections automatically: Select the domains and sites.

This option retrieves all domains and sites from all forests to which the domain user has access.

#### 4. Click Save and Continue.

The Enterprise Control Room login page appears.

#### 5. Select a domain from the drop-down list.

If the drop-down list is empty, see [If the domains drop-down list is empty](#).

#### 6. Type the user credentials that were created in the initial Enterprise Control Room installation.

#### 7. Click Log in.

#### Related tasks

[Log on to Enterprise Control Room hosted in Active Directory/Kerberos mode](#)

#### Related reference

[Custom Enterprise Control Room configuration](#)

#### If the domains drop-down list is empty

Troubleshooting instructions if there are no domains populated in the domain drop-down list on the Enterprise Control Room login page.

This issue can occur when one of the Key Distribution Centers (KDC) servers isn't responding, causing a long delay. If Enterprise Control Room is configured with Active Domain authentication, but after an upgrade there are no domains populated in the domain drop-down list on the Enterprise Control Room login page, follow these steps to fix the error:

#### Procedure

##### 1. Stop the following Enterprise Control Room services:

- Enterprise Control Room Caching
- Enterprise Control Room Messaging
- Enterprise Control Room Service
- Enterprise Control Room Reverse Proxy

##### 2. Make a copy of the `um.properties` file that is located in the folder where Enterprise Control Room is installed on your environment.

The default file path is `C:\Program Files\Automation Anywhere\Enterprise\config\um.properties`.

##### 3. Open the copy file as an administrator.

##### 4. Obtain a list of KDC for all of your domains/forests.

A KDC is the domain controller which serves the Kerberos tickets from users/computers.

- a) Run the following example command in the Command Prompt. Replace `domain.com` with your Enterprise Control Room domain.

```
nslookup -type=srv
_kerberos._tcp.DOMAIN.COM
```

- b) Find the KDCs for each domain in the output lines that start with `svr hostname = .`  
 c) Add the following example entry at the end of the file, replacing domain1.com and domain2.com with your domain names, and host1, host2, and host3 with the KDCs for each domain.  
`um.ldap.kdcs='domain1.com:host1.domain1.com:host2.domain1.com:host3.domain1.com, domain2.com:host4.domain2.com'`  
 Note: The domain must be the first token, followed by one or more KDCs separated by colons and each domain separated by commas.

5. Save and close the file.
6. Start the following Enterprise Control Room services:
  - Enterprise Control Room Caching
  - Enterprise Control Room Messaging
  - Enterprise Control Room Service
  - Enterprise Control Room Reverse Proxy

## Next steps

If the Enterprise Control Room is running in a cluster environment, repeat these steps for each node.

## Uninstall or repair Enterprise Control Room installation

Use the Enterprise Control Room installer to remove (uninstall) or repair an Enterprise Control Room instance. If your system becomes corrupted or malfunctions, run a repair to reset the Enterprise Control Room to its initial settings.

### Remove

Remove the Enterprise Control Room either from the control panel, or with the installer. Remove a patch fix only from the View installed updates option in the control panel.

To remove an Enterprise Control Room instance, do the following:

1. Open the Automation Anywhere installation path and run the setup file.

The InstallShield Wizard appears.

2. Click Next.

**11.3.2** The Program Maintenance window appears.

3. Select Remove and click Next. The Remove the Program window appears.
4. Click Remove.

The Uninstalling Automation Anywhere Enterprise Control Room window appears, and the uninstallation process begins. During the removal process, close the applications that must be updated by the installer and click Retry.

Note: **11.3.2** Do not cancel the removal process. If you cancel partway through the process, some Enterprise Control Room services are not available. In that case, complete the removal process, then redo the Enterprise Control Room installation process.

5. Click Finish when the removal process completes.

## Repair

This option saves the Enterprise Control Room settings from the first installation. When you run the reinstallation, the Enterprise Control Room installer autopopulates fields and autoselects buttons, check boxes, and file paths.

Note: With this option, you cannot change the installation mode or database type. For example, if you initially installed in the Custom mode, the Express options button is disabled.

To repair the Enterprise Control Room, do the following:

1. Open the Automation Anywhere installation path and run the Enterprise Control Room setup file.

The InstallShield Wizard appears.

2. Click Next.

**11.3.2** The Program Maintenance window appears.

3. Select Repair/Reinstall and click Next.

The Remove the Program window appears.

4. Click Remove.

The Uninstalling Automation Anywhere Enterprise Control Room window appears, and the uninstallation process begins. During the removal process, close the applications that must be updated by the installer and click Retry.

Note: **11.3.2** Do not cancel the removal process. If you cancel partway through the process, some Enterprise Control Room services are not available. In that case, complete the removal process, then redo the Enterprise Control Room installation process.

5. Click Finish when the removal process completes.

A popup instructing you to reinstall the program appears.

Note: **11.3.3** From Version 11.3.3 onwards, the popup to reinstall the program does not appear, thereby preventing you to manually run the Enterprise Control Room setup. This enables you to automatically start the reinstallation process with the previous settings.

6. Click OK.

7. Run the Enterprise Control Room setup file.

8. Agree to the License Agreement.

The Installation Type window appears with the installation mode selected.

9. Click Next.

Follow the installation steps to reinstall the Enterprise Control Room. The wizard guides you through the installation with the previous settings already in place.

Note: **11.3.3** During the reinstallation process, you can enable or disable the Enable Cluster Setup check box. Enabling the check box allows you to change the Cluster Configuration by adding or removing node to the cluster list as required.

As needed, type passwords in the fields. For security purposes, passwords are not saved along with Enterprise Control Room settings.

Note: **11.3.2** Do not exit the installer. If you exit partway through the installation process, the saved settings are lost and you must manually reinstall the Enterprise Control Room.

10. In the InstallShield Wizard Completed window, click Finish.

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

Related concepts

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

Related tasks

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

# Enterprise client installation

Review the installation core tasks and topics for installing Enterprise client on any machine running a supported operating system.

The Enterprise client provides the interface for Bot Creator and Bot Runner. It is installed on any device running the supported operating system. The installer executable, `Automation_Anywhere_Enterprise_Client_<version>.exe`, is included in the `Setup` folder download.

## Enterprise client installation core tasks

### Step 1: Pre-installation

#### [Enterprise client prerequisites](#)

Verify the machine and configuration you are using to install the Enterprise client.

#### [Enterprise client install wizard checklist](#)

Prepare your responses for the list of the fields and options presented when you are running the Enterprise client installer wizard.

#### [Enterprise Control Room installation](#)

Review the installation core tasks and topics for installing Enterprise Control Room in a data center on an on-premise server or a cloud service provider server instance.

#### [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.

### Step 2: Installation

#### [Installing the Enterprise client](#)

Complete the listed steps to install the Enterprise client on your machine.

#### [Installing the Enterprise client using scripts](#)

Silent Enterprise client installation is also known as unattended installation. It requires a response file, `Setup.iss`, that is created by recording a first time installation. Silent install runs the entire installation process in the background, on subsequent machines, without requiring user interaction or displaying messages.

#### [Installing dual Enterprise clients](#)

Automation Anywhere Version 11.3 or greater can be installed on the same machine as, (in parallel with) Enterprise client Version 10.x. This is called dual Enterprise clients.

### Step 3: Post-installation

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

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings ensure timely Automation Anywhere communications.

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

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

### [Configuring Access Manager Reverse Proxy](#)

Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room

Step 4: Validation

#### [Logging in to Enterprise client](#)

Logging into your Enterprise client, requires that you have a login to an Enterprise Control Room.

#### [Troubleshooting login errors](#)

Basic troubleshooting practices for login errors.

#### [Log files and locations](#)

When you deploy Automation Anywhere Enterprise, several log files are created and stored in default locations.

## Enterprise client pre-installation

Review and verify the requirements and options before installing Enterprise client.

- [Enterprise client prerequisites](#)

Verify the machine and configuration you are using to install the Enterprise client.

- [Enterprise client install wizard checklist](#)

Prepare your responses for the list of the fields and options presented when you are running the Enterprise client installer wizard.

- [Remote agent for Citrix](#)

The remote agent for Citrix enables you to use the Object cloning command to automate tasks when the Enterprise client is installed outside the Citrix environment. If you plan to use Citrix XenApp, install the Citrix remote agent before you install the Enterprise client.

## Enterprise client prerequisites

Verify the machine and configuration you are using to install the Enterprise client.

The Enterprise client is installed on any device running the supported operating system. This can be a physical or virtual machine. It can be installed on the same server as the Enterprise Control Room although typically installation is on separate machines.

#### [Hardware requirements](#)

The Enterprise Control Room is deployed on servers in data centers. The Enterprise client is deployed on any device that runs the supported operating system. The minimum Automation Anywhere hardware requirements include: server, machine, processor, RAM, disk storage, and network.

#### [Operating system and platform compatibility](#)

Enterprise Control Room and Enterprise client both are installed on machines with supported operating systems. The Enterprise Control Room and Enterprise client tables list the supported Windows versions.

## [Supported plug-ins and services](#)

Enterprise Control Room and Enterprise client require and support the listed Microsoft Windows services and browser plug-ins. Some are optionally installed with Automation Anywhere Enterprise deployment.

## [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.

## [Version compatibility matrix](#)

Before you install or upgrade verify the compatible of your Automation Anywhere Enterprise Control Room and Enterprise client versions.

## [Enterprise Control Room installation](#)

Review the installation core tasks and topics for installing Enterprise Control Room in a data center on an on-premise server or a cloud service provider server instance.

### Related concepts

#### [Enterprise client installation](#)

### Related reference

#### [Enterprise Control Room installation](#)

## Enterprise client install wizard checklist

Prepare your responses for the list of the fields and options presented when you are running the Enterprise client installer wizard.

Wizard field or prompt	Decision options
Before launch installer:  Verify the compatibility of Enterprise client version.	If Enterprise client version older than Version 11.3, uninstall it.
Install redistributable elements:  Visual C++  Microsoft .NET Framework	Accept or exclude either or both.
Select destination folder:  Default: C:\Program Files [x86]\Automation Anywhere\Enterprise\	Accept default or prepare new destination folder.
Select language:  This is the language used in the Enterprise client user interface.  Default: English	Select from language options: <ul style="list-style-type: none"> <li>• English</li> <li>• Japanese</li> <li>• Korean</li> </ul>

Wizard field or prompt	Decision options
Install Automation Anywhere plug-ins: <ul style="list-style-type: none"> <li>• Microsoft Internet Explorer 11</li> <li>• Google Chrome</li> <li>• Microsoft Edge</li> <li>• Java</li> </ul>	Accept or exclude one or more.
Specify Enterprise Control Room URL: This is the URL used to connect to Enterprise Control Room.	Enterprise Control Room URL or Access Manager Reverse Proxy URL
Select run time file folder: Default: C:\Users\Public\Documents\Automation Anywhere Client Files	Select from location options: <ul style="list-style-type: none"> <li>• Public Documents</li> <li>• Program Data</li> </ul>
Specify Enterprise client certificate path: This is used for Access Manager Reverse Proxy. Default: blank	Enter path to Enterprise client certificate.

## Remote agent for Citrix

The remote agent for Citrix enables you to use the Object cloning command to automate tasks when the Enterprise client is installed outside the Citrix environment. If you plan to use Citrix XenApp, install the Citrix remote agent before you install the Enterprise client.

**11.3.2** You can use the remote agent to use the Object cloning command to capture objects based on the Microsoft Windows, Java, and HTML technologies.

Note: **11.3.3** The Remote Agent for Citrix is now Citrix Ready certified. See [Citrix Ready Marketplace](#).

To use this approach, do the following:

### Before Enterprise client installation

Install the Automation Anywhere Citrix remote agent on the machine where Citrix XenApp is installed. Based on the version of the Enterprise client, install the corresponding version of the remote agent. Install the remote agent before you install Enterprise client.

After Enterprise client installation

- Install the Citrix Receiver and Enterprise client Version 11.3.2 or greater on the machine you are using to automate the task.
- Install the Citrix plug-in on the system where the Enterprise client Version 11.3.2 is installed.
- Modify the AA.Settings.xml file.

- [Installing remote agent for Citrix](#)

Install the remote agent for Citrix only on the machine on which the Citrix XenApp virtual application is installed. Do this before you install Enterprise client.

- [Installing Citrix plug-in](#)

Install the Citrix plug-in only on the machine on which the Citrix Receiver and the Enterprise client Version 11.3.2 are installed.

Related tasks

[Installing remote agent for Citrix](#)

[Installing Citrix plug-in](#)

## Installing remote agent for Citrix

**11.3.2** Install the remote agent for Citrix only on the machine on which the Citrix XenApp virtual application is installed. Do this before you install Enterprise client.

Do the following steps to install the remote agent for Citrix:

### Procedure

1. Double-click the Automation\_Anywhere\_Remote\_Agent\_1.0.exe file.
2. On the Automation Anywhere Remote Agent Setup screen, click Yes.
3. On the Automation Anywhere Remote Agent screen, click Next.
4. On the License Agreement screen, select the option to accept the license agreement, and then click Next.
5. On the Choose Destination Location screen, click Browse to specify the location for installing the remote agent, and then click Next.  
The default location for installation is set to C:\Program Files (X86)\Automation Anywhere\AARemoteAgent
6. On the Setup Status screen, track the status of the installation process.
7. On the Setup Wizard Completed screen, click Finish to complete the setup.

Related concepts

[Remote agent for Citrix](#)

Related tasks

[Installing Citrix plug-in](#)

## Installing the Enterprise client

Complete the listed steps to install the Enterprise client on your machine.

## Prerequisites

- Verify the Enterprise client prerequisites are met.
- Verify Enterprise Control Room is installed and users are created.
- Upgrading:
  - If you are upgrading from Enterprise client older than Version 11.3:  
Do a complete uninstall before installing the new Enterprise client.  
For example, if your current Enterprise client is version 10.x or 11.2.x, uninstall your Enterprise client before installing a Version 11.3 or greater Enterprise client.
  - If you are upgrading from or first-time installing Enterprise client Version 11.3 or later:  
An uninstall is not required. Apply your Version 11.3 or greater Enterprise client. You can apply the next version installation directly on your machine.  
For example: If the current Enterprise client is Version 11.3 then Version 11.3.1 can be installed directly.

Note: The steps listed here apply to Enterprise client installation on Windows machines, Windows multi-user terminal servers, and the listed cloud and virtual machine platforms.

- **11.3.2** Amazon Web Services
- **11.3.2** Microsoft Azure
- Google Cloud Platform
- **11.3.3** VMware Horizon Client

See [Enterprise client machine requirements](#) for descriptions of all the Enterprise client supported platforms.

## Procedure

1. As Administrator, log in to the machine that has the Enterprise client installation executable.
2. Expand the Setup folder and run the Enterprise client installer,  
`Automation_Anywhere_Enterprise_Client_<version>.exe`.

The installer first checks for Visual C++ Redistributables for VS 2015 and .NET Framework v4.6. If Visual C++ Redistributable is missing, the installer prompts you to install that component.

- Note:** **11.3.2** There can be a slight delay for the Automation Anywhere Enterprise client installation wizard to appear as these checks are completed.
3. Click Yes, if the system prompts, Do you want to allow this app to make changes to your device?  
The installation wizard Welcome screen appears.
  4. Proceed with the installation, from the wizard Welcome page click Next.
  5. Accept the terms of the License Agreement, and click Next.
  6. Select the Destination Folder to setup to the installation files, then click Next.  
The default location is `C:\Program Files [x86]\Automation Anywhere\Enterprise\`.

The Ready to Install the Program screen appears.

7. **11.3.2** Select the installation options, then click Install.
  - From the pull-down, select the Language for the Enterprise client user interface.
  - Check box for Create Desktop Icon
  - Check boxes for Plugin Installation: Microsoft Internet Explorer 11, Google Chrome, Microsoft Edge, and/or Java.  
Note: To install the Microsoft Edge plug-in, close any open instance of the Microsoft Edge browser.
8. Optional: Click More Options to apply additional configuration options. Enter values as needed, then click OK.

#### Enterprise Control Room URL

For upgrades, the login window automatically populates the Enterprise Control Room URL.

- 11.3.2** If the Access Manager Reverse Proxy server, for example, IBM WebSEAL, is used for the secure connection, then type the Reverse Proxy URL instead of the Enterprise Control Room URL.

#### Folder for run-time files

Select a destination to store related folders and files that are used when the application is running.

- If installing the Enterprise client for the first time, and choosing to store run-time folders and files in Program Data, those are created in the Program Data folder.
- If upgrading, the existing folders and files are copied from the Public Documents to the Program Data folder.
- If Program Data was selected during installation or a reinstall previously, ensure that Program Data is selected again. By default, Public Documents is configured.

Note: If you are switching to Public Documents after previously using Program Data, manually copy the content in the folders: Automation Auto-login, Automation Schedules, and Enterprise client Files. the Public Documents,

#### 11.3.2 Client Certificate Path

**11.3.2** Type the Client Certificate Path for mutual authentication with the Access Manager Reverse Proxy server, for example, IBM WebSEAL, in any one of the following formats:

- subject:%username@%domain% Where: %username% is the username of the Microsoft Windows user who has logged in and %domain% is the value of the Windows domain.
- subject:%username@xyz.com Where: %username% is the username of the Microsoft Windows user who has logged in and xyz is the domain.
- subject:default\_certificate Where: the value provided here is assigned as the certificate subject.

If you do not provide any value, any previous value is overwritten as a blank.

#### **11.3.2** See [Configuring Access Manager Reverse Proxy](#).

Note: Only IBM WebSEAL is certified for mutual authentication using the Access Manager Reverse Proxy.

9. From the Installation Options wizard page, click Install. When installation completes, click Finish.

#### **11.3.2**

The Automation Anywhere language pack is installed after successful installation of the Enterprise client and can take a few minutes.

The Enterprise client login screen appears, if the Launch Automation Anywhere Enterprise client check box was selected.

10. Finish installation tasks.

If any of the dependency services such as AAAutoLoginService, AAClientService, and AASchedulerService are not running, manually start them from Microsoft Windows Task Manager > Services.

To display a non-default language in the Enterprise client, re-login or restart the machine. When restart completes, wait a minute to allow the Automation Anywhere language services to start before opening the Enterprise client.

## Installing the Enterprise client using scripts

Silent Enterprise client installation is also known as unattended installation. It requires a response file, `Setup.iss`, that is created by recording a first time installation. Silent install runs the entire installation process in the background, on subsequent machines, without requiring user interaction or displaying messages.

### Prerequisites

- Verify the Enterprise client prerequisites are met.
- Verify Enterprise Control Room is installed and users are created.
- Create a response file on one machine. This file contains the installation and uninstallation steps that were recorded during the process. See [Creating a silent install response file](#).

Use command-line mode or a batch script to invoke Enterprise client installer and enable the response file.

Note: The silent installation option is for installing or uninstalling the product. Do not use silent installation for modifying or repairing the installation.

### Procedure

1. Log in to each machine to install Enterprise client.
2. In a single folder on each machine, copy the `setup.iss` response file and the Enterprise client installer, `Automation_Anywhere_Enterprise_Client_<version>.exe`.
3. From the command line prompt, or through a script, invoke the Enterprise client installer.

```
D:\Setup\
Automation_Anywhere_Enterprise_Client_<version>.exe
      /s
```

```
D:\Setup\
setup.iss
```

- Use the `/z` option to pass data to the `InstallScript` system variable `CMDLINE`.
- Use opening and closing quotes ("") in your source file path if it contains any spaces.
- [Creating a silent install response file](#)  
Create a response file for use with a Enterprise client silent installation. This response file is a recording of, and provides the responses a user would make when, manually installing the Enterprise client.
- [Viewing silent installation log files and error messages](#)  
Overview of the logs generated during a silent installation.

## Creating a silent install response file

Create a response file for use with a Enterprise client silent installation. This response file is a recording of, and provides the responses a user would make when, manually installing the Enterprise client.

The installation response file is created with the name of `setup.iss`.

Create separate response files for 32-bit and 64-bit operating system versions.

## Procedure

1. Login to a machine with the Automation Anywhere Setup and locate the Enterprise client installer.  
For example: `D:\Setup\Automation_Anywhere_Enterprise_Client_<version>.exe`.
2. From the Microsoft Windows command prompt, run the Enterprise client installer executable with the `/r` option.

```
D:\Setup\>
Automation_Anywhere_Enterprise_Client_<version>.exe
/r
```

Note: **11.3.2** If you select a language from the Ready to install the Program installation wizard page, the silent install only recognizes and applies that selected language. It does not apply any alternate language selected later.

3. Follow the instructions in the Automation Anywhere Client <version> installation wizard. See [Installing the Enterprise client](#).

The `/r` option records the parameters you select as you complete the installation wizard. Your responses are stored in the `setup.iss` file. The `setup.iss` file is stored in the Microsoft Windows `%SystemRoot%` folder.

4. After Enterprise client installation completes successfully, copy the required files to each machine for silent installation. Ensure both files are in the same folder.
  - Response file, `Setup.iss`
  - Enterprise client installer file, `Automation_Anywhere_Enterprise_Client_<version>.exe`

Note: Do not rename the `setup.iss` file.

## Viewing silent installation log files and error messages

Overview of the logs generated during a silent installation.

Two log files are generated during Enterprise client or Enterprise Control Room silent installation:

- `setup.log`
- `productname.txt`

## Working with the `setup.log` file

The `setup.log` file is created in the same directory as the response file. The `/f2` option enables you to specify an alternative log file location and filename. For example: `C:\Setup.exe /s /f2 C:\Setup.log`

The result codes and descriptions are listed in the following table:

Result code	Description
0	Success
-1	General Error
-2	Invalid Mode
-3	Required data not found in the setup.iss file
-4	Not enough memory available
-5	File does not exist
-6	Cannot write to response file
-7	Unable to write to the log file
-8	Invalid path to the InstallShield Silent response (.iss) file
-9	Not a valid list type (string or number)
-10	Data type is invalid
-11	Unknown error during setup
-12	Dialog boxes are out of order
-51	Cannot create the specified folder
-52	Cannot access the specified file or folder
-53	Invalid option selected

## Working with the productname.txt file

The productname.txt file is created on the desktop when any of the following errors occur:

- The required Microsoft .NET Framework is not present to install the Microsoft .NET Framework.
- Services are unable to start.

For further details on installation and uninstallation of the Enterprise Control Room and Enterprise client, contact [support.automationanywhere.com](https://support.automationanywhere.com).

## Installing dual Enterprise clients

Automation Anywhere Version 11.3 or greater can be installed on the same machine as, (in parallel with) Enterprise client Version 10.x. This is called dual Enterprise clients.

### Prerequisites

- Verify the Enterprise client prerequisites are met.
- Verify Enterprise Control Room is installed and users are created.

This capability is useful in migration scenarios. Dual Enterprise clients allows you to take a bot, that is running in Version 10.x production, and test it on Version 11.3 or greater before moving it to Version 11.3 production.

To install a parallel version of the Enterprise client:

## Procedure

1. Log on to a machine with Enterprise client version 10.x and Enterprise client Version 11.3 or greater installer, `Automation_Anywhere_Enterprise_Client_<version>.exe`, downloaded.
2. Open the Microsoft Windows command prompt and navigate to the Enterprise client Version 11.3 or greater `Setup` folder.  
For example, `D:\Setup\Automation_Anywhere_Enterprise_Client_<version>.exe`.
3. Run the installer with the `/parallel` option. Type at the command prompt and press Enter.

```
D:\Setup\>
Automation_Anywhere_Enterprise_Client_<version>.exe
    /parallel
```

The Enterprise client installation wizard appears.

4. Follow the instructions in the Automation Anywhere Client <version> installation wizard. See [Installing the Enterprise client](#).  
To install the product in silent mode, see [Installing dual Enterprise clients in silent mode](#).

## Next steps

In [Configuring and using dual Enterprise clients](#), configure both Enterprise clients to use bots.

- [Installing dual Enterprise clients in silent mode](#)

Silently install Enterprise client Version 11.3 or greater, in parallel with Enterprise client Version 10.x. Silent Enterprise client installation is also known as unattended installation. It requires a response file, `setup.iss`, that is created by recording a first time installation. Silent install runs the entire installation process in the background without requiring user interaction or displaying messages.

- [Configuring and using dual Enterprise clients](#)

Configure Enterprise client Version 11.3 for using bots. How to .

## Installing dual Enterprise clients in silent mode

Silently install Enterprise client Version 11.3 or greater, in parallel with Enterprise client Version 10.x. Silent Enterprise client installation is also known as unattended installation. It requires a response file, `setup.iss`, that is created by recording a first time installation. Silent install runs the entire installation process in the background without requiring user interaction or displaying messages.

The silent installation is divided into two parts: Record the installation (which generates the `setup.iss` file with the install parameters) and install the product silently using the `/parallel` option.

## Procedure

1. Log on to a machine with Enterprise client version 10.x and Enterprise client Version 11.3 or greater installer, `Automation_Anywhere_Enterprise_Client_<version>.exe`, downloaded.
2. Open the Microsoft Windows command prompt and navigate to the Enterprise client Version 11.3 or greater Setup folder.  
For example, `D:\Setup\Automation_Anywhere_Enterprise_Client_<version>.exe`.
3. From the Microsoft Windows command prompt, run the Enterprise client installer executable with the `/parallel` and `/r` options and press Enter.

```
D:\Setup\>
Automation_Anywhere_Enterprise_Client_<version>.exe
    /parallel /r
```

This records the installation steps in the response `setup.iss` file as you do them. The `setup.iss` file is stored in the Microsoft Windows `%SystemRoot%` folder.

The Enterprise client 11.3 installation window appears.

4. Follow the instructions in the Automation Anywhere Client <version> installation wizard. See [Installing the Enterprise client](#).

The `/r` option records the parameters you select as you complete the installation wizard. Your responses are stored in the `setup.iss` file. The `setup.iss` file is stored in the Microsoft Windows `%SystemRoot%` folder.

5. After Enterprise client installation completes successfully, copy the required files to each machine for silent installation. Ensure both files are in the same folder.
  - Response file, `Setup.iss`
  - Enterprise client installer file, `Automation_Anywhere_Enterprise_Client_<version>.exe`

Note: Do not rename the `setup.iss` file.
6. Log in to each machine to install Enterprise client silently, open the Microsoft Windows command prompt and navigate to the Enterprise client Version 11.3 or greater Setup folder.  
For example, `D:\Setup\Automation_Anywhere_Enterprise_Client_<version>.exe`.
7. Run the installer with the `/parallel` and `/s` option. Type at the command prompt and press Enter.

```
D:\Setup\>
Automation_Anywhere_Enterprise_Client_<version>.exe
    /parallel /s
```

The installation starts in silent mode. No installation screens are shown.

## Next steps

### Configuring and using dual Enterprise clients

Configure Enterprise client Version 11.3 for using bots. How to .

When the Enterprise client Version 11.3 is installed in parallel with Enterprise client Version 10.x, a duplicate installation footprint exists. If you check the Microsoft Windows Task Manager, you see two sets of services.

---

### Separate application path for Enterprise client v11.3

- To avoid accidental overwriting of Version 10.x bots, Enterprise client Version 11.3 points to a different application path.
- The Version 11.3 application path is by default the My Documents folder, for example, D:\\username\\My Documents\\AAE\_V11\\Automation Anywhere Files.
- The Version 11.3 application path is empty.

Action:: Manually copy the bots from the Version 10.x application path into the Version 11.3 application path. This allows the Version 11.3 Enterprise client to locate and test the bots.

### Separate configuration path for Enterprise client Version 11.3

- To avoid overwriting the Enterprise client Version 10.x configuration, Enterprise client Version 11.3 points to a different configuration path.
- A new folder named v11 is created inside the Version 10.x configuration path. This sub-folder stores the Version 11.3 configuration. For example:

If the current Version 10.x configuration path is:

```
C:\Users\Public\Documents\Automation Anywhere Client Files
```

The Version 11.3 configuration path is:

```
C:\Users\Public\Documents\Automation Anywhere Client Files\v11.
```

- Because the configuration path is different, none of the existing Version 10.x schedules, triggers, or Auto login settings are imported.

Action: Manually add the Auto login settings in the Version 11.3 Enterprise client, select Tools > Options > Login Settings. Also, create your schedules and triggers in Version 11.3.

Use only one version of Enterprise client at a time.

To switch from one Enterprise client version to another, exit the currently open version, then start the other version. To exit:

1. In the Microsoft Windows Taskbar, right-click the Automation Anywhere icon .
2. Click Exit.

### Create and play bots

Bots created in a lower version can run in higher versions.

- Bots created in Enterprise client Version 10.x can be edited and played in Enterprise client Version 11.3.
- Bots created in Enterprise client Version 11.3 cannot be edited and played in Enterprise client Version 10.x.

### Deploy bots one at a time

Deploy a bot from a matching Enterprise Control Room to the same version Enterprise client.

- From Enterprise Control Room Version 10.x to Enterprise client Version 10.x.
- From Enterprise Control Room Version 11.3 to Enterprise client Version 11.3.

Bots cannot be deployed from one version Enterprise Control Room to another version Enterprise client or from one version Enterprise client to another version Enterprise Control Room.

## Enterprise client post-installation configuration

After installing the Enterprise client, complete the configuration settings to ensure timely Automation Anywhere communications are specified, confirm Automation Anywhere services are running, and configuring the Access Manager reverse proxy.

- [Configuring post installation settings](#)

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings ensure timely Automation Anywhere communications.

- [Verifying Automation Anywhere Windows services](#)

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

- [Configuring ABBYY for Automation Anywhere](#)

Automation Anywhere supports a specific configuration of the ABBYY OCR engine to capture images.

- [Configuring Access Manager Reverse Proxy](#)

Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room.

- [Using BAPI to automate tasks in SAP](#)

Automation Anywhere Enterprise integrates with SAP using Business Application Programming Interface (BAPI). BAPI is a standardized method that allows a third-party application to interact with an SAP system.

- [Installing Citrix plug-in](#)

Install the Citrix plug-in only on the machine on which the Citrix Receiver and the Enterprise client Version 11.3.2 are installed.

- [Configuring Terminal Emulator logs](#)

Terminal Emulator log files sometimes occupies too much disk space if they are not restricted to a limited size. To optimize disk space, use the Automation Anywhere Enterprise client's feature that enables configuring intervals for cleaning terminal logs.

### Related tasks

[Installing the Enterprise client](#)

[Installing the Enterprise client using scripts](#)

[Installing dual Enterprise clients](#)

### Related reference

[Enterprise client pre-installation](#)

[Enterprise client post-installation validation](#)

## Configuring post installation settings

After you finish installing the Enterprise Control Room and Enterprise client, ensure the following items are configured. These configuration settings 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.

From Windows, select Control Panel > Region > Administrative > Change system locale.

### Set the Region

Select English (United States) as the Region Format.

From Windows, select Control Panel > Region > Format.

### Set Time synchronization

Enable Network Time Protocol (NTP) on both the Enterprise Control Room and Enterprise client. For additional information about setting the NTP, contact your system administrator.

### For Microsoft Azure platform installation

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, Subversion Version Control and SMTP settings.

### Related reference

[Verifying Automation Anywhere Windows services](#)

[Working with SQL Servers](#)

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

[Enterprise client post-installation configuration](#)

## Verifying Automation Anywhere Windows services

Automation Anywhere specific Windows Services are installed when the Enterprise Control Room is deployed.

### To verify installed Windows services

From your Windows device:

1. Select Control Panel > Administrator Tools > Services.

The specific path to Services can vary, depending upon your specific Windows version.

2. Scroll through the list to find the listed service name. Note the Status.

## Enterprise Control Room Windows services

Verify that the following Windows services are installed by the Automation Anywhere Enterprise Control Room installer.

Service Name	Description
Automation Anywhere Bot Insight EDC	Used to extract data from Automation Anywhere databases to create dashboards.
Automation Anywhere Bot Insight Elastic Search	Enterprise connector to pull data from Elasticsearch based data source into the dashboard.
Automation Anywhere Bot Insight <a href="#">PostgreSQL Server</a>	PostgreSQL database server for use by Automation Anywhere.
Automation Anywhere Bot Insight Query Engine	Controls and manages queries, including all filtering and data manipulation on the dashboard.
Automation Anywhere Bot Insight Scheduler	Periodically updates Automation Anywhere dashboards. This service connects to the Bot Insight Visualization service to update the database.
Automation Anywhere Bot Insight Service	Receives and processes API requests for Bot Insight.
Automation Anywhere Bot Insight Service Discovery	Provides the ability for Bot Insight services to find each other.
Automation Anywhere Bot Insight Visualization	Renders service requests for dashboards within the Bot Insight application. Any request that pertains to adding, configuring, or deleting widgets goes through this service.
Automation Anywhere Control Room Caching	Used for distributed cache storage.
Automation Anywhere Control Room Messaging	Allows Enterprise Control Room services to communicate asynchronously.

Service Name	Description
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 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 more information, Elasticsearch documentation can be found <a href="#">here</a> .
Automation Anywhere Licensing	Manages licensing information for Automation Anywhere products and services.

Note: All the services can be configured either in Local System or Domain account when the Enterprise Control Room is installed in Custom mode. For a Enterprise Control Room installed in Express mode, all the services are run in Local System account.

## Enterprise client Windows services

Verify that the following Windows services are installed by the Enterprise client installer.

Service	Description
<a href="#">AAAutoLoginService</a> , Automation Anywhere Enterprise Auto Login Service	This service provides support for automatic login functionality in the .
<a href="#">AAClientService</a> , Automation Anywhere Enterprise Client Service	This service provides support for the client services functionality in theEnterprise client.
<a href="#">AAESchedulerService</a> , Automation Anywhere Enterprise Scheduler Service	This service provides support for Scheduling functionality in the Enterprise client.

Related concepts

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

Related tasks

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

## Configuring ABBYY for Automation Anywhere

Automation Anywhere supports a specific configuration of the ABBYY OCR engine to capture images.

Do the following steps to configure ABBYY for Automation Anywhere:

## Procedure

1. Install ABBYY FineReader engine 11 on the machine.

Note: **11.3.2** If you are using the Enterprise client Version 11.3.2, the FineReader 12 is installed by default in the Enterprise client Version 11.3.2 and does not require separate installation.

2. Use your license key to activate ABBYY through the ABBYY License Manager.
3. Modify the app.config file available at the C:\Program Files (x86)\Automation Anywhere\Enterprise\Client\plugins\commands\ocr\ABBYY.

a) Specify your ABBYY license key in the following tag:

```
add key="LicenseKey" value="YOUR ABBYY LICENSE KEY" /
```

b) Specify the location where you installed ABBYY FineReader in the following tag:

```
add key ="EnginePath" value="LOCATION WHERE FINEREADER IS INSTALLED" /
```

c) Specify the location of the ABBYY parameters file in the following tag:

```
add key ="ProfilePath" value="LOCATION OF THE ABBYY_Parameters.ini FILE" /
```

d) **11.3.2** Specify the following parameter if using ABBY version 11 with Enterprise client Version 11.3.2:

```
add key ="FREVersion11" value="true"
```

**11.3.2** If you are using FineReader 12:

- Specify the location of the ABBYY parameters file in the following tag:

```
add key ="ProfilePath" value="LOCATION OF THE ABBYY_Parameters.ini FILE" /
```

- Ensure that you have the Modify and Write permissions for the C:\Program Files (x86)\Automation Anywhere\Enterprise\Client\plugins\commands\ocr\ABBYY folder.

The ABBYY OCR engine uses a set of predefined parameters with their corresponding default values. To optimize the value of the extracted text, change the values of these parameters available in the ABBYY\_Parameters.ini file. You can uncomment the available parameters in the file or add new parameters and their values that are supported by ABBYY. Any changes you make in this file are reflected in all the instances where OCR is used in Automation Anywhere.

## Configuring Access Manager Reverse Proxy

**11.3.2** Configure an Access Manager Reverse Proxy server, such as IBM WebSEAL, to enable secure communication, using mutual authentication between the Enterprise client and the Enterprise Control Room.

### Reverse proxy server prerequisites

- Install Automation Anywhere Enterprise Version 11.3.2 or later. This includes both Enterprise client and Enterprise Control Room.
- Ensure a Microsoft Windows user Trusted Client Certificate exists for every Enterprise client user. The user-specific certificate establishes that user as a trusted user.
- Install the Trusted Client Certificate on every machine running the Enterprise client.

---

Store the certificate in Microsoft Windows certificate store > Personal > Current User.

Note: Only IBM WebSEAL is certified for mutual authentication using the Access Manager Reverse Proxy.

## Reverse proxy server process

1. The first request from the Enterprise client to the Enterprise Control Room is authenticated by the Reverse Proxy server using the Client Certificate mechanism.
2. The Reverse Proxy server returns the response with a cookie, which is used for all the subsequent requests.
3. Each subsequent user login does not require additional authentication with a certificate. The same cookie is used when:
  - Trusted users change the Enterprise Control Room authentication type.
  - Trusted users switch to another Enterprise Control Room.

Related tasks

[Logging in to Enterprise client](#)

[Installing the Enterprise client](#)

## Using BAPI to automate tasks in SAP

Automation Anywhere Enterprise integrates with SAP using Business Application Programming Interface (BAPI). BAPI is a standardized method that allows a third-party application to interact with an SAP system.

Automation Anywhere Enterprise provides four commands to integrate with an SAP system:

- Connect
- Run Standard BAPI
- Run Custom Workflow
- Run Remote Function Call

## Prerequisites

SAP plug-in bundle must be installed on the machine used to automate tasks on an SAP system.

If you are using Enterprise client version 11.x, you must:

1. Download the SAP .NET Connector from the SAP website.
2. Install the SAP .NET Connector on your machine.
3. Copy the `sapnco.dll` and `sapnco_utils.dll` files from the SAP .NET Connector installation folder to the Enterprise client installation folder.

- [Using standard BAPI](#)

Automation Anywhere Enterprise allows you to use SAP standardized BAPIs that provide basic functions and can be used for various SAP business objects.

## Using standard BAPI

Automation Anywhere Enterprise allows you to use SAP standardized BAPIs that provide basic functions and can be used for various SAP business objects.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Using BAPI to automate tasks in SAP](#) are met.

Note: You must use Connect as the first command when you automate an SAP task using BAPI.  
To use SAP standardized BAPIs:

## Procedure

1. Expand the SAP Integration command node and double-click the Run Standard BAPI command.  
The SAP Integration dialog box appears.
2. Enter a name for the session in the Session Name field.
3. Click the Select option next to the Select Standard BAPI field.  
The BAPI Explorer dialog box appears. The dialog box lists all the BAPIs that are available for the various SAP modules.
4. Select the BAPI you want to use from the Select BAPI section.
5. You can click the Import, Export, and Table tabs, to view the import, export, and table parameters for the BAPI you have selected.
6. Click OK.  
The selected BAPI is now available in the SAP Integration dialog box.
7. You can select the Save Output to CSV option, to save the output into a CSV file.
8. Enter a location where you want to save the file.
9. Select an option from the Encoding list, to specify the encoding stand you want to apply on the CSV file.
10. You can select the Append to csv option if you want to append the output to an existing CSV file, and then click Save.

## Installing Citrix plug-in

**11.3.2** Install the Citrix plug-in only on the machine on which the Citrix Receiver and the Enterprise client Version 11.3.2 are installed.

Note: Install the Citrix receiver on the machine before you install the Citrix plug-in.

Do the following steps to install the Citrix plug-in:

## Procedure

1. Open the command prompt in Admin mode.
2. Change the directory to the location where the Enterprise client is installed.  
For example, if the client is installed at the location C:\Program Files (x86)\Automation Anywhere\Enterprise\Client, you run the command cd "C:\Program Files (x86)\Automation Anywhere\Enterprise\Client".
3. Run the command AAPuginInstallation.exe /citrix /install.

A success message appears after successful installation of the Citrix plug-in.

4. On the Automation Anywhere Client dialog box, click OK.

5. **11.3.2** Modify the AA.Settings.xml file:

- Select Options from the Tools menu on the Enterprise client window, to get the location of the file.
- Click Advanced Settings.
- Open the AA.Settings.xml file available at the location shown in the Application Path field.
- Add the tags highlighted in the following image in those tags:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <configuration>
  + <Editor>
  + <EventWatcher>
  - <Main>
    + <general>
    + <startuppages>
    - <options>
      + <activedirectory>
      - <advancedsettings>
        <ietimeoutvalue>240</ietimeoutvalue>
        <editondoubleclick>0</editondoubleclick>
        <recordmousemove>1</recordmousemove>
        <recordmouseclicks>1</recordmouseclicks>
        <recordkeystrokes>1</recordkeystrokes>
        <isremoteobjectdetectionenabled>true</isremoteobjectdetectionenabled>
        <capturescreenshotrecord>1</capturescreenshotrecord>
        <capturescreenshotplay>0</capturescreenshotplay>
        <enablelogging>1</enablelogging>
        <ietimeoutcheck>1</ietimeoutcheck>
        <applicationpath> </applicationpath>
      </advancedsettings>
    - <runtimesettings>
      <capturescreenshotplay>0</capturescreenshotplay>
      <citrixchanneltimeout>240000</citrixchanneltimeout>
    </runtimesettings>
  + <clientsettings>
```

The value in the citrixchanneltimeout tag specifies the timeout in milliseconds for a Citrix session.  
Specify the required value.

6. Save and close the file.

Related concepts

[Remote agent for Citrix](#)

Related tasks

[Installing remote agent for Citrix](#)

## Configuring Terminal Emulator logs

Terminal Emulator log files sometimes occupies too much disk space if they are not restricted to a limited size. To optimize disk space, use the Automation Anywhere Enterprise client's feature that enables configuring intervals for cleaning terminal logs.

To configure Terminal Emulator logs:

## Procedure

1. Open the `AA.Settings` file available at Automation Anywhere client application path.
2. Specify the number of days to preserve log file in the following tag:

```
<Player>
<commands>
<terminalemulator>
  <numberofdaystopreservelogfiles>30
  </numberofdaystopreservelogfiles>
</terminalemulator>
</commands>
</Player>
```

Valid range is from 1 to 60 Days. The default value is 7 days.

For example, if the interval is set to 7 days, the log files older than 7 days will be deleted on clean-up action. The clean-up action takes place everyday.

### Related reference

[Terminal Emulator command](#)

## Enterprise client post-installation validation

After installing the Enterprise client and completing the post-installation tasks, validate the Enterprise client by logging in to the Enterprise Control Room.

- [Logging in to Enterprise client](#)  
Logging into your Enterprise client, requires that you have a login to an Enterprise Control Room.
- [Troubleshooting login errors](#)  
Basic troubleshooting practices for login errors.
- [Log files and locations](#)  
When you deploy Automation Anywhere Enterprise, several log files are created and stored in default locations.

## Logging in to Enterprise client

Logging into your Enterprise client, requires that you have a login to an Enterprise Control Room.

## Prerequisites

The Enterprise client works with the Enterprise Control Room. To use the functions of the Enterprise client, requires:

- 
- You have a user credentials for access to the Enterprise Control Room.
  - Your username has roles and permission to use Bot Creator and/or Bot Runner.

Administrators create and manage users. See [User management overview](#).

To validate installation of the Enterprise client, log in to Enterprise Control Room using the Enterprise client:

## Procedure

1. Launch theEnterprise client.
2. Enter the Enterprise Control Room URL in the prompted format, `https://<hostname>:<port>`

The Enterprise client login requires connecting to a Enterprise Control Room.

If an Access Manager Reverse Proxy server is used for a secure connection, for example, IBM WebSEAL, then type the Reverse Proxy server URL instead of the Enterprise Control Room URL.

3. Enter your Enterprise Control Room user credentials.

- [Change Enterprise Control Room logged in user](#)

From the Enterprise Control Room, you can change the user you are using to do tasks. Each user is defined with roles and permissions, by changing the user you are logged in as, you enable different roles and permissions.

## Change Enterprise Control Room logged in user

From the Enterprise Control Room, you can change the user you are using to do tasks. Each user is defined with roles and permissions, by changing the user you are logged in as, you enable different roles and permissions.

## Prerequisites

Log in to the Enterprise Control Room using one of your allocated user names and credentials.

To re-login to the Enterprise Control Room using different user credentials:

## Procedure

1. From the Enterprise client, select Tools Re-login.
2. Enter the user credentials at the prompt.  
Note: The logged in username and status appear in the status bar.

## Next steps

## Troubleshooting login errors

Basic troubleshooting practices for login errors.

If there are issues with the login to the Enterprise Control Room, troubleshoot based on the displayed messages. For example:

#### Invalid credentials

The input contained an incorrect username and/or password. Check for common typographical mistakes, such as Caps Lock ON.

#### Non-Existen User

TheEnterprise client is not created in the Enterprise Control Room to which you are trying to connect.

#### Unlicensed User

You have not been allocated the required license.

#### Unverified

Email verification is pending.

#### Inactive User

The Enterprise Control Room administrator has deactivated your Enterprise client.

#### User is registered on another machine

You tried to log in from a different machine than the one from which you have registered.

#### Version incompatibility

You tried to connect to a Enterprise Control Room that is a different version than the Enterprise client.

Note: If there is a major version mismatch, that is, any of the components is of a higher version than another, then you upgrade to the appropriate version. For example: Enterprise client at Version 11.3.1 and Enterprise Control Room at Version 11.3.

## Log files and locations

When you deploy Automation Anywhere Enterprise, several log files are created and stored in default locations.

Most Automation Anywhere logs are stored in C:\ProgramData. These are the logs for documenting Automation Anywhere Enterprise activities.

These are not the logs for bot activities. The locations for the bot activities are relative to the specific bot activity. For example, a bot task that runs Excel, generates Excel logs.

#### Server files

Default store in C:\ProgramData

#### Temp files

Default store in C:\ProgramData

#### Properties file logs

Default location stored in log4j.properties file of each respective component

#### Bot Insight

Default store in C:\ProgramData

<https://www.elastic.co/guide/index.html>

Default location stored in elasticsearch.yml file

## Change log file locations

To change a log folder location:

1. Edit the log properties files as listed in, [Log file location edits](#).

- 
2. Restart each respective service after the log locations are changed.

## Log file location edits

The following changes log file location for all log files except `bidbliquibase`, and `crdbliquibase`. Liquibase logs location cannot be changed. Liquibase logs are only used during install, not after that.

`log4j2.xml`

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\config\log4j2.xml
```

Change:

```
Property name="logPath"$  
{env:PROGRAMDATA}  
/AutomationAnywhere/Logs/Property
```

`log4j2-activemq.xml`

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\config\log4j2-activemq.xml
```

Change:

```
Property name="logPath"$  
{env:PROGRAMDATA}  
/AutomationAnywhere/Logs/Property
```

`log4j2-ignite`

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\config\log4j2-ignite
```

Change:

```
Property name="logPath"$  
{env:PROGRAMDATA}  
/AutomationAnywhere/Logs/Property
```

zoomdata.properties

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf\zoomdata.properties
```

Change:

```
logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs  
  
zoomdata.activity.logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs
```

scheduler.properties

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf\scheduler.properties
```

Change:

```
logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs
```

query-engine.properties

Edit file:

```
C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf\query-engine.properties
```

Change:

```
logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs
```

```
query-engine.activity.logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs
```

edc-mssql.properties

Edit file:

```
C:\\Program Files\\Automation Anywhere\\Enterprise\\zoomdata\\conf\\edc-mssql.properties
```

Change:

```
logs.dir=C:\\ProgramData\\AutomationAnywhere\\Logs
```

licenseLogger.txt

Edit file:

```
C:\\Program Files\\Automation Anywhere\\Enterprise\\service\\AutomationAnywhere\\Controlroom.Service.exe.config
```

Change:

```
file type="log4net.Util.PatternString" value="%envFolderPath{CommonApplicationData}\\AutomationAnywhere\\Logs\\licenseLogger.txt"
```

Blservice

Edit file:

```
C:\\Program Files\\Automation Anywhere\\Enterprise\\DWAService\\bin\\src\\main\\resources\\log4j.properties
```

Change:

```
log4j.appender.file.File=C:\\ProgramData\\AutomationAnywhere\\Logs\\BI_Service.log
```

## Uninstall or repair Enterprise client installation

The process to uninstall or repair the Enterprise client.

### Uninstall

To uninstall, go to Control Panel → Programs and Features. Select the desired Enterprise client file and click Uninstall.

Alternatively, choose to remove the Enterprise client by launching the Setup Wizard:

1. Select Remove.
2. Click Next.

**11.3.2** Do not shut down the machine immediately after uninstalling the Enterprise client. The uninstall process takes up to a couple of minutes to uninstall the Automation Anywhere language pack after successfully uninstalling the Enterprise client .

Note: The uninstall process for the Enterprise client does not remove all related folders, for example, the Client Repository folder.

**11.3.2** When uninstalling the Enterprise client from a Citrix or a terminal server environment, the Automation Anywhere language packs (Linguify Language pack and Linguify applications) might not be uninstalled by the uninstall process. You must uninstall them manually from the Control Panel.

### Repair

Use the repair option to reinstall all the program features that were installed during the initial setup run.

1. Launch the Automation Anywhere Setup Wizard and select the Repair option.
2. Click Next.

# Using Enterprise Control Room

Enterprise Control Room is a central interface that allows you to manage and monitor all the processes of your RPA infrastructure

Explore	Set up	Administer
<ul style="list-style-type: none"> <li>• <a href="#">Enterprise Control Room Overview</a></li> <li>• <a href="#">Bots - Overview</a></li> <li>• <a href="#">Dashboards overview</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Getting started</a></li> <li>• <a href="#">Configuring Enterprise Control Room authentication options</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Upgrade to a higher 11.x version</a></li> <li>• <a href="#">Post upgrade AD configuration</a></li> </ul>

Use	Develop	Troubleshoot
<ul style="list-style-type: none"> <li>• <a href="#">Create and Edit Folders</a></li> <li>• <a href="#">Run a Bot</a></li> <li>• <a href="#">View Bot Details</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Enterprise Control Room APIs</a></li> <li>• <a href="#">APIs to manage credential vault</a></li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Troubleshooting Automation File Permissions</a></li> </ul>

- [\*\*Log on to Enterprise Control Room\*\*](#)

To log on to Enterprise Control Room, double-click the Automation Anywhere Enterprise Control Room icon on your desktop.

- [\*\*Getting Started with Enterprise Control Room\*\*](#)

Here are some resources to help you get started with Enterprise Control Room.

- [\*\*Administration Overview\*\*](#)

As a Enterprise Control Room admin you can use the administration module to complete the following tasks.

- [\*\*Bots - Overview\*\*](#)

As a Enterprise Control Room user with administrator or My Bots privileges, you can use the bots module of Enterprise Control Room to do the following.

- [\*\*Activity overview\*\*](#)

Use the Activity management page to view activities that are scheduled and are in progress. Also view a historical chronology of activities performed on a bot.

- [\*\*Devices overview\*\*](#)

A device is an Automation Anywhere Enterprise client machine that connects you to the Enterprise Control Room to create or run bots.

- [\*\*Workload overview\*\*](#)

Use the Workload Management page to divide your automations into small, yet logical work items. Process them simultaneously to ensure that time-based Service Level Agreements (SLAs) are met with optimum resource utilization. Additionally, integrate with a chat application to share the outcome of workload automation with your organization's customers.

- [\*\*Bot Store integration overview\*\*](#)

The seamless integration of the Bot Store enables you to access the Bot Store directly from the Enterprise Control Room. In the Enterprise Control Room, you can download bots and Digital Workers from the Bot Store or create and package Digital Workers and bots to be uploaded to the Bot Store.

- [Audit log overview](#)

Across the platform, event details along with the outcome are automatically captured for more than 60 types of entity actions, including creation, modification, enablement, disablement, and removal of users, bots, Bot Creators, and Bot Runners. Comprehensive and continuous audit logging capabilities in the Enterprise Control Room ensures enterprise-level security and quality compliance.

- [Dashboards overview](#)

The Enterprise Control Room dashboard provides graphical insight into your RPA infrastructure so that you can analyze, interpret, and make informed decisions for your bots.

- [Enterprise Control Room APIs](#)

The Automation Anywhere Enterprise Control Room provides various public APIs which allow you to customize your business automation for third-party applications.

- [Control room troubleshooting issues](#)

Known troubleshooting issues and solutions related to the control room are documented here. Use the Send Feedback option at the bottom of every content page to provide constructive feedback and suggestions.

- [Guidelines for General Data Protection Regulation](#)

The General Data Protection Regulation (GDPR) is one of the strictest compliance frameworks with respect to maintaining privacy of personal data. The GDPR defines personal data as any data that can be used to identify a natural person.

Related concepts

[Bots - Overview](#)

[Dashboards overview](#)

[Enterprise Control Room Overview](#)

Related reference

[Enterprise Control Room Automations API](#)

## Log on to Enterprise Control Room

To log on to Enterprise Control Room, double-click the Automation Anywhere Enterprise Control Room icon on your desktop.

The log on screens for Enterprise Control Room are different depending on whether it is hosted in [Active Directory](#) Kerberos mode or Non-Active Directory mode.

Note: Enterprise Control Room does not allow multiple sessions to the same account at the same time.

- [Log on to Enterprise Control Room hosted in Single Sign On mode](#)

You can now provide your SSO credentials on the trusted identity provider (IdP) server page of your organization after the Enterprise Control Room is registered as a service provider with the IdP.

- [Log on to Enterprise Control Room hosted in Non-Active Directory mode](#)

Type your credentials on the login screen to log in to the Enterprise Control Room hosted in a Non-Active Directory mode.

- [Log on to Enterprise Control Room hosted in Active Directory/Kerberos mode](#)

To log in to the Enterprise Control Room in Active Directory mode first select the domain and then enter your credentials.

- [Log on to Bot Insight](#)

Bot Insight helps automation experts obtain real-time business insights and digital workforce performance measurements. Deployed bots generate, interact with, and process large amounts of data, which aids automation experts and consumers to interactively analyze task data and enhance widgets.

- [Re-login to Enterprise Control Room when password policy is updated](#)

You must change your password when the Enterprise Control Room admin updates the password policy in Enterprise Control Room Settings.

- [Reset LDAP user credentials](#)

When your LDAP user password expires or username is disabled/deleted, the Enterprise Control Room admin user must reset the credentials to enable you to login to the Enterprise Control Room.

#### Related tasks

[Log on to Enterprise Control Room hosted in Active Directory/Kerberos mode](#)

[Log on to Enterprise Control Room hosted in Non-Active Directory mode](#)

[Log on to Enterprise Control Room hosted in Single Sign On mode](#)

## Log on to Enterprise Control Room hosted in Single Sign On mode

You can now provide your SSO credentials on the trusted identity provider (IdP) server page of your organization after the Enterprise Control Room is registered as a service provider with the IdP.

To do that perform the following steps:

### Procedure

1. Double-click the Automation Anywhere Enterprise Control Room icon on your desktop or type the Enterprise Control Room URL on your Web browser and press the Enter key.

The Log in screen is displayed.

2. Click Login

When your SSO credentials are authenticated through the IdP server page of your organization, on trying to login, you will be redirected to a trusted identity provider (IdP) of your organization (for example Okta) that has been preconfigured to accept authentication requests from multiple applications including the Enterprise Control Room.

If the IdP Server URL is not valid or the server is down, you are shown appropriate message configured for it. For example, 404 or Bad Gateway.

3. Click Log In.

You will be shown an error message and cannot log in:

- If you provide incorrect credentials/IdP server credentials.
- If your user account is disabled.
- If you log in twice.

You will be logged off the account you are logged into currently and asked to login again.

- If your email address is not verified.

On successful authentication in the IdP server, you are logged into the Enterprise Control Room.

- You are automatically logged into the Enterprise Control Room if you open the Enterprise Control Room in the same browser or refresh the page as you are already authenticated by the IdP server.
- When you Logout (available when you click <username> in the profile) of the Enterprise Control Room, you are not logged out of other applications running with the same IdP Server.

#### Related concepts

[Getting Started with Enterprise Control Room](#)  
[Configure Enterprise Control Room for Single Sign-On](#)

## Log on to Enterprise Control Room hosted in Non-Active Directory mode

Type your credentials on the login screen to log in to the Enterprise Control Room hosted in a Non-Active Directory mode.

### Procedure

1. Double-click the Automation Anywhere Enterprise Control Room icon on your desktop or type the Enterprise Control Room URL on your Web browser and press the Enter key.  
The Log in screen is displayed.
2. Enter your Automation Anywhere Enterprise (AAE) user name.
3. Optional: Select Remember my username to quickly login to the Enterprise Control Room.
4. Optional: Click Forgot password? to reset your password.
  - Admin users will have to provide answers to the security questions that were configured during user creation. After you provide correct answers, you are taken to the navigation page.
  - Non-admin users are directly taken to the change password page. If you provide incorrect credentials during log in, you are shown an error message.

**11.3.2** If using Automation Anywhere Enterprise Control Room Version 11.3.2 and higher, all users (admin and non-admin) have to provide answers to the security questions. After three incorrect attempts:

- a) Click the link sent to your registered email id for verification, if Email Notifications are enabled.  
See [Email settings](#).
  - b) Fill in the CAPTCHA text to verify your credentials.
5. Type your Automation Anywhere Enterprise (AAE) password and click Log in.

The credentials are authenticated directly with the CR database.

Note:

- Your account will be locked if you type the wrong password for a certain number of times depending on the password policy set by your administrator.
- For security reasons, failed log in attempts are audited, which allows the administrator to analyze and take appropriate actions.

Related tasks

[Email settings](#)

## Log on to Enterprise Control Room hosted in Active Directory/Kerberos mode

To login to the Enterprise Control Room in Active Directory mode first select the domain and then enter your credentials.

To log on to Enterprise Control Room hosted in Active Directory/Kerberos mode, perform the following steps.

## Procedure

1. Double-click the Automation Anywhere Enterprise Control Room icon on your desktop or type the Enterprise Control Room URL on your Web browser and press the Enter key.  
The Log in screen is displayed.
2. In the Log in screen
  - For single forest multi-domain environment, do the following.
    - Domain: Select the domain of the Active Directory.
    - Username: Type your Active Directory user name.
    - Password: Type your Active Directory password.

Click the Log in button. The log in details are authenticated directly with the Active Directory Domain Controller when you log in.

- For Kerberos environment, click the Log in with Windows button.

You do not need to enter your user name and password. You will be logged in with your current Windows account.

Note that,

- Your session will timeout in 20 minutes after you log in and the session is idle for that time period unless configured in settings. Refer details on [login and session settings](#).
- Multiple sessions of the same user account is not allowed. If you are logged in at one instance and later log to another instance, for example different browser on same machine or different machine, you are allowed to log in with new session. However, when you perform a new request in the earlier session, you will be logged out.
- If the domain controller credentials have expired, the list of domains is not available. To troubleshoot, refer [Reset Active Directory credentials](#) for details.

## Log on to Bot Insight

Bot Insight helps automation experts obtain real-time business insights and digital workforce performance measurements. Deployed bots generate, interact with, and process large amounts of data, which aids automation experts and consumers to interactively analyze task data and enhance widgets.

When you are logged into one component of Automation Anywhere, you do not need to log into the other component. [Single Sign On \(SSO\)](#) automatically logs you into all the other components.

To use Bot Insight, the Enterprise Control Room must have Bot Insight licensing applied, and you must be logged in as a user with either `AAE_Bot_Insight_Expert` or `AAE_Bot_Insight_Consumer` roles.

In the [Control Room](#), on the left pane, click DASHBOARDS > Insights.

The screenshot shows the 'Control Room' interface with the 'Insights' tab selected. The left sidebar includes links for Home, Bots, Devices, Audit, Workload, and Insights. The main content area displays a brief description of Bot Insights and a link to 'Open Bot Insight in a new tab...'. A yellow lightbulb icon is present.

On the right pane, click Open Bot Insights. The system opens the Bot Insights application in a separate tab without the need for you to login again into Bot Insights.

## Re-login to Enterprise Control Room when password policy is updated

You must change your password when the Enterprise Control Room admin updates the password policy in Enterprise Control Room Settings.

If the policy is updated, next time you login to the Enterprise Control Room, the Change password screen is displayed, where you can update your password:

## Change password

The password policies for Automation Anywhere Enterprise have been updated by the Control Room Administrator. Please provide a new password conforming with the new password policies.

Username: mike.lee

Old password

\*\*\*\*\*

∅

New password

\*\*\*\*\*

∅

8-15 characters; a-z, A-Z, 0-9, @, -, \_, !, #, \$, %, &, and . allowed. Requires at least one of each of the following:

- Special character

Confirm new password

\*\*\*\*\*

∅

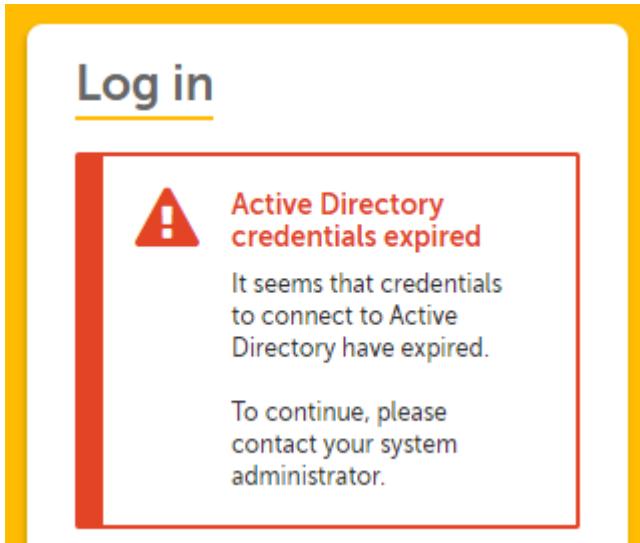
**Save changes**

Click Save changes to login successfully.

## Reset LDAP user credentials

When your LDAP user password expires or username is disabled/deleted, the Enterprise Control Room admin user must reset the credentials to enable you to login to the Enterprise Control Room.

When your LDAP user password expires or username is disabled/deleted, you will not be able to login to the Enterprise Control Room. In such cases, when a non-admin user tries to login to the Enterprise Control Room, following error message is shown:



An Enterprise Control Room admin user must update the LDAP user's valid credentials after logging into the Enterprise Control Room.

## Procedure

1. The admin user must enter credentials to login to the Enterprise Control Room.  
Ensure that the Username is in the NETBIOS\username format (example, domain.com\john.smith).  
After login the admin user will be directed to update the credentials of the LDAP user.
2. Enter the Domain username and password.  
Ensure that the Domain username is in the UPN (userPrincipleName) - username@domain.com format.  
Domain username in domainname\username format is not supported. For example, john.smith@aaspl-brd.com is supported; whereas, aaspl-brd\john.smith is not supported.

**11.3.2** In Version 11.3.2, after entering the username and password in the Change Active Directory configuration page, you can either enter the LDAP URL(s) manually by selecting Manually add connections or chose to Discover connections automatically.

## Getting Started with Enterprise Control Room

Here are some resources to help you get started with Enterprise Control Room.

- [Enterprise Control Room overview](#)
- [Enterprise Control Room interface](#)
- [Configuring Enterprise Control Room for the first time](#)
- [Logging on to Enterprise Control Room](#)
- [Adding users to your installation of Enterprise Control Room](#)
- [Assigning roles to the users you have created](#)

### [Enterprise Control Room overview](#)

The Enterprise Control Room is the brain of the digital workforce platform. It is a Microsoft Windows server-based web application providing a single administrator interface for Enterprise-wide bot deployment, management, and control.

- [Enterprise Control Room interface overview](#)

The Enterprise Control Room interface provides multiple options to manage and monitor the different components of the RPA infrastructure.

## Enterprise Control Room overview

The Enterprise Control Room is the brain of the digital workforce platform. It is a Microsoft Windows server-based web application providing a single administrator interface for Enterprise-wide bot deployment, management, and control.

Enterprise Control Room provides automated provisioning, orchestration, governance, and actionable analytics for Enterprise-wide implementation.

## Why use Enterprise Control Room?

- Leverage multiple authentication options of Active Directory using LDAP, Active Directory using Kerberos, local authentication using the embedded Credential Vault, and Single Sign-On using Security Assertion Markup Language (SAML) 2.0.
- Ensure the secure digital workforce platform based on granular role-based access control (RBAC) and industrial grade encryption for data at rest and in transit.
- Control remotely running automations centrally.
- Access built-in version control feature for multi-user collaboration.
- Store system-managed credentials and critical system configuration data using secure Credential Vaults.
- Enforce best practices to meet stringent compliance mandates using Bot Lifecycle Management (BLM).

## What you must know about access control, management, and monitoring

### Access control

As an administrator, define custom roles and set permissions for the full suite of Enterprise Control Room objects and functions, including user management, licensing, Credential Vault, bot schedules, dashboards, and audit logs.

See [Roles Overview](#) and [User management overview](#) for more information.

### Centralized management

Meet the demands of dynamic service level agreements (SLAs) using dynamic workload management (WLM) for industrial-scale automation. WLM includes built-in SLA calculators with a human-in-the-loop flexibility to enable prioritization of high-value task queues.

See [Workload overview](#) for more information.

### Monitor using reports

Capture event details for user and entity actions including the creation, modification, enablement, disablement, and removal of users, bots, Bot Creators, and Bot Runners.

Customize automated dashboards and reports to identify and alert you about abnormal activities.

Export logs to use other analysis, reporting, and incident investigation/response infrastructure already in use by the organization, for example, Security Information and Event Management (SIEM) and advanced analytics tools.

See [Audit log overview](#) and [Dashboards overview](#) for more information.

#### Related concepts

[Dashboards overview](#)

[Activity overview](#)

[Bots - Overview](#)

[Credentials - Overview](#)

[Devices overview](#)

[Workload overview](#)

[Audit log overview](#)

[Roles Overview](#)

[Related reference](#)

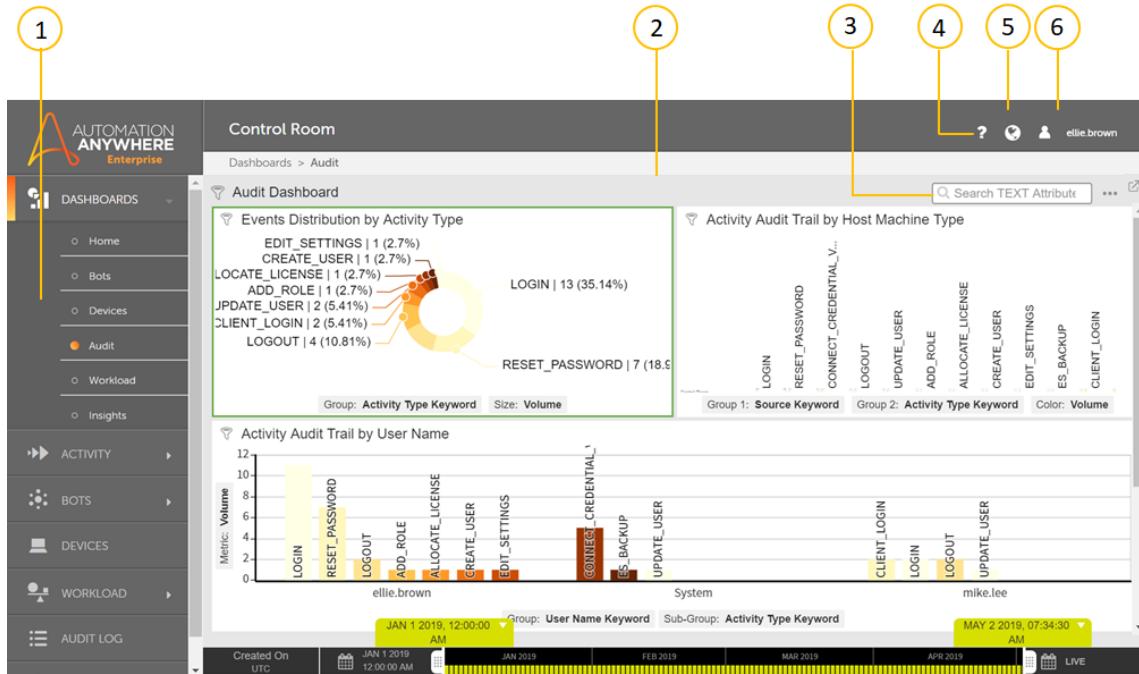
[Manage scheduled activity](#)

[User management overview](#)

## Enterprise Control Room interface overview

The Enterprise Control Room interface provides multiple options to manage and monitor the different components of the RPA infrastructure.

The Enterprise Control Room interface contains the following components:



1. Navigation pane: Navigate to [Dashboards](#), [Activity](#), [Bots](#), [Devices](#), [Workload](#), [Audit log](#), or [Administration](#). Each view differs depending on the assigned roles and permissions.
2. Details area: View details of users, roles, bots, and so on, depending on the selected option. Create, edit, and delete single or multiple records.

Navigational breadcrumbs appear at the top. Use them to return to a previous view.

3. Search and filter: Search or filter data shown in the Details area and results are shown in tables. The [Control Room](#) remembers the last filter applied by each user for every session. The search feature is available in all pages of Enterprise Control Room, including Bot Insight.
4. Help: Access links to the following resources:
  - Help with the current page
  - Online documentation
  - Automation Anywhere Support
  - Automation Anywhere Sales
  - Entire Automation Anywhere website
5. **11.3.2** Language: Choose the default language to appear for the Enterprise Control Room interface from:
6. Profile: Personalize and maintain your Enterprise Control Room profile by selecting Edit Profile, Change Password, or Generate API-Key.
  - Change your password: Provide your new password in the Change password form.
  - Edit your profile: Update your first name, last name, or email address in the Edit Profile form.
  - **11.3.2** Generate API-Key: Create the API Key to use for authentication when using the Enterprise Control Room Authentication API. This link is available only if the Enterprise Control Room admin user gives the Generate API-Key permission to a user role.

If a user generates a new API Key when an API Key is already available, it is overwritten. The user can copy the key and use it for authentication for an API call.

Note: The process of managing your own profile is different for Enterprise Control Room configured with an Active Directory and a non-Active Directory environment. Users cannot configure or make changes to their profile in an [Active Directory](#) environment. Users configured with a non-Active Directory environment can change the password, first name, last name, and email address.

## Administration Overview

As a Enterprise Control Room admin you can use the administration module to complete the following tasks.

- [Manage roles by creating, editing, deleting, and viewing existing roles](#)
- [Manage users by creating, editing, deleting, and viewing existing users](#)
- [Change the general settings of Enterprise Control Room](#)
- [Purchase an extended license or install a new license](#)
- [Settings overview](#)  
As a Enterprise Control Room administrator, you can customize the Enterprise Control Room by configuring settings related to the database, Credential Vault, version control, and so on.
- [User management overview](#)  
As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

- [Roles Overview](#)

Administrator or user(s) with roles permission can Create, Edit, Delete roles for various features and operations in Enterprise Control Room.

- [Licenses - an overview](#)

The Enterprise Control Room License page provides detailed information about the current license that is installed. It also enables the Admin user to monitor license details and usage statistics.

- [Migration overview](#)

Migration is moving data using a systematic and phased process from Automation Anywhere v10.x to v11.x.x. As an Enterprise Control Room administrator with View and Manage Migration permissions, use the Migration Wizard tool to migrate data.

## Settings overview

As a Enterprise Control Room administrator, you can customize the Enterprise Control Room by configuring settings related to the database, Credential Vault, version control, and so on.

- Configure General Settings and Enterprise Control Room Database & Software in [Configuration settings](#)

- Enable or disable Version Control in [Bots](#)

- Enable or disable Secure recording, set Product help URLs, and configure Device health checks in [Client applications](#)

- Configure the connection mode to the Credential Vault in [Credentials](#)

- Enable or disable email settings in [Email](#)

- [11.3.2](#) Configure the connection to syslog servers [Configuring Syslog service](#)

- [11.3.2](#) Change Active Directory configuration mode in [Configuring Active Directory Settings](#)

- [Enterprise client application](#)

As a Enterprise Control Room administrator you can choose to configure the settings relevant to your Enterprise client application.

- [Configuration settings](#)

As a Enterprise Control Room administrator, view and manage settings that are configured for the Enterprise Control Room.

- [Email settings](#)

As a Enterprise Control Room admin, opt to send email notifications to other Enterprise Control Room users when certain activities that affect the users are updated such as password change, user information, account activation/deactivation, TaskBot execution status, and so on.

- [Bots - Configure Version Control](#)

To control edits to files that might include TaskBots, MetaBots, Reports, and Workflows, as a Enterprise Control Room admin you can configure version control in Enterprise Control Room Settings.

- [Configuring Syslog service](#)

You can configure the Enterprise Control Room so that the Audit Log entries can be exported in the Syslog format to remote Syslog compatible log management servers.

- [Configuring Active Directory Settings](#)

As a Enterprise Control Room administrator you can edit the Active Directory configuration setting to either discover the available domains and sites automatically (auto mode) or manually enter the LDAP URLs (manual mode).

## Enterprise client application

As a Enterprise Control Room administrator you can choose to configure the settings relevant to your Enterprise client application.

You can:

- Enable or disable secure recording
- Update settings to allows passing Credential Vault variables from one bot to another
- Change product help URLs
- Configure device health checks
- Configure audit entry to view local bot run
- Select time zone while scheduling a bot
- Turn Bot Insight on by default
- Tag Bot variables for data output

## Secure recording

Secure recording offers you a choice between capturing or not capturing images and control values during business process recording by [Bot Creators](#). You can enable secure recording when you are automating secure applications such as bank accounts.

To modify secure recording settings:

1. Select Client application
2. Click  Edit.

The page opens in edit mode wherein secure recording is Off by default.

3. Select Secure recording is On .
4. Click Save changes.

## Pass Credential Vault variables to MetaBot

Passing of Credential Vault variables can be controlled by using the setting Pass Credential Vault variable to MetaBot. This is enabled when you want to allow passing credential variables stored in the Credential Vault from TaskBots to MetaBot Logic and from one Logic to another Logic in the same MetaBot.

Default setting is On.

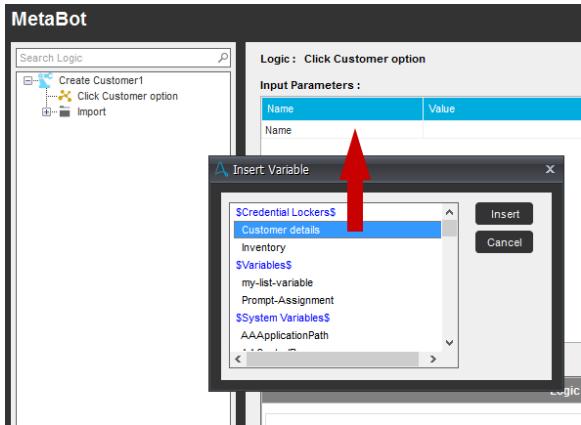
To modify,

1. Select Client application.
2. Click  Edit.

The page opens in edit mode wherein Passing of Credential Vault variables to MetaBot is On.

3. Select Off if you do not want to allow the bot to pass the variable to another bot.
4. Click Save changes.

The following illustrates how a Bot Creator can pass a credential variable from a TaskBot to a MetaBot Logic when the setting is enabled:



## Product help URLs

Product help URLs allow you to redirect links to Automation Anywhere Support Site or to any Custom URL of your choice.

- Use Automation Anywhere's URLs - Use this to navigate your users to the default Automation Anywhere Support site. This disables all the other options such as Live Chat with Support URL etc.
- Use Custom URLs - Use this to navigate your users to your custom defined URLs for Product help. This allows your users to seek help from in-house automation experts.
- Table below summarizes Product help URLs:

URL	Description
Automation Anywhere Enterprise client application support	It allows you to add your customized Product Help URL and redirect users to your in-house support site.
Live chat with support	It allows you to access in-house Live Chat and speak to online Experts.
Example online	It allows you to look for available Online Examples.
Request live 1-on-1 demo	It allows you to request for live demonstration of features and experts would answer your questions.
Technical support	It allows you to access in-house Technical Support.
Ask the expert	It allows you to speak to an expert and get their expert advice.

To modify Product help URL settings:

1. Select Client application.
2. Click Edit.

The page opens in edit mode wherein Use Automation Anywhere URLs are selected by default.

3. Select Use Custom URL as required.

For example, you might want to redirect Live chat support to a specific chat group. You must use http(s) protocol in the URLs. If you do not, then an error message is displayed.

4. Click Save changes.

## Device health check configuration

These settings allows you to set the time interval for Device Health check that includes parameters such as CPU, Memory, and Disk usage etc. You can therefore set the frequency at which the data is exchanged between the Enterprise Control Room and connected Enterprise clients.

To modify Device health check configuration

1. Select Client application.
2. Click Edit.

The page opens in edit mode wherein the Blip interval during bot execution can be enabled. The default value is set to 60 seconds

3. Change the Blip interval time as required. You cannot input less than 60 or empty value. If you do, then an error message is displayed.
4. Click Save changes.

## Local Bot Run Audit

To audit the local bot run by the Bot Creators and/or Bot Runners, a setting has been provided in the Enterprise Control Room. When enabled, the Enterprise Control Room will audit the bot run by the user on the Enterprise client machine.

The local bot run can be initiated by:

1. Pressing the 'Run' button on the Automation Anywhere Main Client or Workbench
2. By Hotkey
3. By Local Schedule
4. By Local Trigger
5. By Workflow

The entry in Audit Logs depicts the Action type as Run Bot (Local Client) started and Run Bot (Local Client) finished. Refer sample illustration of Audit Logs details page:

ACTION DETAILS	
Status	Successful
Action taken by	arry chen
Object type	Action
Source device	PRODUCTCTLT07.AASPL-BRD.COM
Request ID	e3b32854-64b3-44ea-8aaa-4b82d7bd942f

LOG DETAILS	
Item name	Analytics,LATH Reconciliation atm
Time	14:25:29 IST 2018-07-06
Action type	Run Bot (Local Client) started
Source	Client

## Bot Insight configuration

Use this setting to allow a Bot Creator to tag the bot variables for analysis. By default, Analytics tagging for Bots is set to Off. To modify, select On. This enables the setting in the Add Variable window. See topic Creating variables for details.

The Bot Insight Configuration setting is available only if the Enterprise Control Room has Business Analytics purchased or trial license.

### 11.3.2 API Deployment Configuration

Use this setting to allow a Bot Creator to tag the bot variables for data output. By default, Allow bot output is set to Off. To modify, select On. This enables the 'Include in Output' check-box to be displayed in Add Variables window so that the value of the variable can be passed on as output when the bot is deployed by the Bot Deployment API. See topic Creating variables for details.

## Whitelist File Extensions to Prevent Uploading of Malicious Files

To prevent uploading of malicious files on the Enterprise client, the Enterprise Control Room administrator uses Whitelisted file extensions feature. The Enterprise Control Room administrator can add the file extensions that need to be whitelisted from Enterprise client. Enterprise client users can upload only whitelisted file extensions included in this list.

To add a new file extension to the whitelist:

1. Click Only listed extensions radio button.
2. Enter the file extension to whitelist in the Whitelisted file extensions text box and click Add.
3. Scroll up and click Save changes.

## Modification details

The modification details such as Modified by and Last modified date/time are captured. The Enterprise client application tab shows System and the Enterprise Control Room installation/configuration date and time by default when you launch the Settings page.

## Audit Logs

All updates to the Client application settings are captured in the Audit Log page.

To view details of each audit entry:

1. Go to the required data and mouse over 
2. Click 

The details page is launched where in you can view only those entries that are changed. The illustration below shows details of successful disabling of Secure Recording mode, change in Client application support URL, and change in Blip Interval:

Audit log > View action

## Edit Settings

< Back

ACTION DETAILS	
Status	Successful
Action taken by	admin
Object type	Action
Source device	127.0.0.0
Item name	Client application configuration settings
Time	2017-12-12 17:02:31 IST
Action type	Edit Settings
Source	Control Room

EDIT SETTINGS DETAILS		
WHAT CHANGED?	OLD VALUE	NEW VALUE
Secure Recording	On	Off
AAE client application support URL	Use Automation Anywhere's URL https://support.automationanywhere.com	
Blip interval during bot execution (sec)	2	10

### Related tasks

[View Audit Details](#)

[Create new variables](#)

Related reference

[Restrict upload of malicious files](#)

## Configuration settings

As a Enterprise Control Room administrator, view and manage settings that are configured for the Enterprise Control Room.

To view configuration details, select AdministrationSettingsGeneral.

- [Control Room](#) Installation type, access URL, and program files destination folder, from the Enterprise Control Room .
- Website Security & Configuration details, Enterprise Control Room Users, Database, and Repository details, Deployment settings, and Security details in [Enterprise Control Room Database & Software](#).

## General settings

The General settings provide information about the installation type, the access URL and program files destination folder. You cannot edit these settings as they are configured during installation.

The screenshot shows the 'General' configuration settings page. At the top, there's a header with the title 'General' and a 'Edit' button. Below the header, a section titled 'Configuration settings' is shown with a note: 'Many of these settings were initially configured during installation.' A navigation bar at the bottom includes tabs for 'GENERAL SETTINGS' and 'CONTROL ROOM DATABASE & SOFTWARE'. The main content area contains a table with two rows: one for 'Installation type' (set to 'Express') and another for 'Control Room access URL' (set to 'http://PRODUCT:81'). At the bottom of this section, it says 'Modified by System' and 'Last modified 20:53:37 2017-10-26 IST'.

The table below describes the General settings:

Settings	Description
Enterprise Control Room Installation type	It is the type of setup used to install the Enterprise Control Room - either Express or Custom. This setting is configured during installation and is not editable.
Enterprise Control Room access URL	<p>It is the fully qualified name of the server that is used by <a href="#">Bot Creator</a>, <a href="#">Bot Runner</a> and Users to access the Enterprise Control Room. Opt to change the access URL if the Enterprise Control Room is setup in custom mode.</p> <p>To modify the URL,</p> <ol style="list-style-type: none"> <li>Click edit </li> <li>The General Settings page opens in edit mode.</li> <li>Type the fully qualified name of the URL to access the Enterprise Control Room.</li> <li>Click Save changes.</li> </ol>

## Edit and View Enterprise Control Room database and software configuration

The Enterprise Control Room database and software settings provide details for website security and configuration, Enterprise Control Room users, database, and repository, deployment, and security settings. Edit settings for the Enterprise Control Room repository, Deployment, and Password.

The table below describes the Enterprise Control Room Database and Software settings:

Settings	Description
Website security	It shows the type of security protocol used - <code>http</code> or <code>https</code> . This setting is configured during installation and is not editable.

Settings	Description
Website configuration	<p>It shows the website configuration details such as web server host name. If the Enterprise Control Room is configured for Express installation, only one host name is shown. However, if it is configured for Custom installation, multiple host names are shown. This setting is configured during installation and is not editable.</p> <p>Web server host name and port details of all registered and active users are listed. However, note that the username and password values are not shown.</p>
Enterprise Control Room users	<p>It shows the Authentication type used to log on to the Enterprise Control Room instance by bots. It could be <a href="#">Active Directory</a>, <a href="#">Single Sign On (SSO)</a> <a href="#">SAML</a> or Database. This setting is configured during installation and is not editable.</p> <ul style="list-style-type: none"> <li>• <a href="#">Active Directory</a> users are configured when Bots of a specific domain have to be authenticated with their Active Directory credentials.</li> <li>• Single Sign-On (SAML 2.0) users are configured when Bots have to be authenticated using SAML 2.0 protocol and users have to log on using the organizations' IdP server credentials.</li> <li>• Database users or Non-Active Directory users are configured when Bots have to be authenticated using the Enterprise Control Room database.</li> </ul>
Enterprise Control Room database	<p>It shows the settings for:</p> <ul style="list-style-type: none"> <li>• <a href="#">11.3.2</a> Database type - It is the database selected (SQL Server or Oracle) for storing Enterprise Control Room data.</li> <li>• Windows authentication - It is the authentication type used to connect to the database server. It shows Enabled when Windows Authentication is selected for database configuration during installation. It shows Disabled when default database authentication is used.</li> <li>• Server host name - It is the fully qualified name of the Enterprise Control Room database server.</li> <li>• Server port - It is the port to which the database is configured.</li> <li>• <a href="#">11.3.2</a> The default listening port number for SQL Server is 1433, for Oracle 1521, and Oracle with SSL is 2484.</li> <li>• Database name - It is the database that will be used to store Enterprise Control Room data. <a href="#">11.3.2</a> In the case of Oracle, it is the Database instance name that was created initially by the system admin.</li> <li>• Username - It is the SQL Server username if the SQL Server authentication type is selected. If Windows authentication is selected, no value is displayed. <a href="#">11.3.2</a> If Oracle is selected as the database,</li> </ul>

Settings	Description
	<p>the value displayed is the Enterprise Control Room Username that was created initially by the system administrator.</p> <p>This setting is configured during installation and is not editable.</p>
Enterprise Control Room repository	<p>It shows the location where all Bots, application files, and supporting files are stored. The default path is set to C:\ProgramData\AutomationAnywhere\Server Files during installation, if not updated during installation. Also choose to modify this path post installation here.</p> <p>Before changing the repository path, ensure that you:</p> <ul style="list-style-type: none"> <li>• Copy the existing files to another location</li> <li>• Put the Enterprise Control Room in maintenance mode</li> <li>• Inform users to disconnect their devices from the Enterprise Control Room instance</li> </ul> <p>To modify:</p> <ol style="list-style-type: none"> <li>1. Click Edit.</li> </ol> <p>The page opens in edit mode.</p> <ol style="list-style-type: none"> <li>2. In the Repository path field, type the location of the repository ending with Server Files: <ul style="list-style-type: none"> <li>• Use Network Drive folders for repository path.</li> <li>• When you type an invalid pathname, an error is displayed.</li> </ul> </li> <li>3. Click Save changes.</li> </ol>
Session settings	<ol style="list-style-type: none"> <li>1. The login settings allow to automatically time-out users from the Enterprise Control Room browser session after 20 minutes of inactivity. By default this setting is Enabled. To modify: a) Click Edit. The page opens in edit mode. b) Select Enabled or Disabled as required for Time-out users in case of inactivity</li> <li>2. The session settings allow or disallow users to be automatically logged into the Enterprise Control Room when they navigate to the Enterprise Control Room URL via browser if the Enterprise Control Room is configured for Kerberos enabled Active Directory authentication.</li> </ol>

Settings	Description
	<p>By default this setting is Enabled.</p> <p>To modify:</p> <ul style="list-style-type: none"> <li>a) Click Edit.</li> </ul> <p>The page opens in edit mode.</p> <ul style="list-style-type: none"> <li>b) Select Enabled or Disabled as required for Auto-login users into the Enterprise Control Room</li> </ul>
Deployment settings	<p>Bot Runner deployment session - It shows whether the users with run and schedule privileges is allowed to Run bot runner session on Enterprise Control Room when you deploy or schedule a Bot. Refer <a href="#">Run a bot</a> and <a href="#">Schedule a Bot</a> for details.</p> <p>By default this setting is Enabled.</p> <p>To modify:</p> <ol style="list-style-type: none"> <li>1. Click Edit to open the page in edit mode</li> <li>2. Select Enabled or Disabled as required for Bot Runner deployment session on Enterprise Control Room</li> </ol>
11.3.2 Deployment settings	<p>Callback URLs - It allows a user to configure known callback URLs for Bot Deployment API to send the Bot status and the Bot output from variables after the bot has finished execution.</p> <p>To modify:</p> <ol style="list-style-type: none"> <li>1. Type the Callback URL in the text box and save</li> </ol>
Security	<p>These define the password policy settings for all Enterprise Control Room users. Customize the password length, password content, select the number of log on attempts allowed, and/or enable or disable security related question and answers.</p> <p>The password policy is applicable for a Enterprise Control Room that is configured for Database authentication type.</p> <p>To modify:</p> <ol style="list-style-type: none"> <li>1. Click Edit.</li> </ol> <p>The page opens in edit mode.</p> <ol style="list-style-type: none"> <li>2. Specify the Minimum and Maximum Password length in character as per your company policy which could include any or all of Alphabetical character, Number, Capital letter, and Special character.</li> <li>3. Specify the number of login attempts allowed before the user account is locked.</li> </ol>

Settings	Description
	<p>Tip: The user account is disabled in the Enterprise Control Room when it is locked out.</p> <p>You cannot type invalid values in the:</p> <ul style="list-style-type: none"> <li>• Password length field</li> <li>• Log on attempts field</li> </ul> <p>4. <b>11.3.2</b> Choose either Enabled or Disabled for security questions and answers. When the option is enabled, users provide answers to certain security related question on clicking the Forgot password link.</p> <p>5. Save changes.</p>
Elastic search disaster recovery backup cluster	This defines the cluster IP address for Elastic search disaster recovery. Elastic search is used to store Audit Logs. Also, use it to edit the Cluster IP addresses field.
<b>11.3.2</b> API key duration	<p>This defines the validity of Authentication API key in days or minutes for a user.</p> <p>1. To specify the duration or validity of the API key in either day(s) or minute(s) type or click +/-</p> <ul style="list-style-type: none"> <li>• Default value is set to 1 day and maximum limit is 45 days or 64800 minutes.</li> <li>• Validity of an existing API key for an authorized user is not affected if the Enterprise Control Room admin changes the duration. For example, when a user is authorized to use the API key for 2 days, and the admin updates it to 5 hours in the interim, the user will be allowed to use the API key for 2 days. However, an API key created thereon will be valid for 5 hours.</li> </ul>

## Audit Logs

All updates to the Configuration Settings are captured in the Audit Log page. For example, the following illustration shows all actions performed to edit general settings:

## Audit log

Audit log

Time filter: Last 24 hours								
Status	▼	Choose status						
Action type:	Edit Settings	Item name:	General configuration	X			X	
Actions (2 of 23)								
STATUS	TIME	ACTION TYPE	ITEM NAME	ACTION TAKEN BY	SOURCE DEVICE	SOURCE		
<input type="checkbox"/>	Successful 16:28:31 IST 2017-12-12	Edit Settings	General configuration settings	admin	127.0.0.0	Control Room	⋮	
<input type="checkbox"/>	Successful 16:26:45 IST 2017-12-12	Edit Settings	General configuration settings	admin	127.0.0.0	Control Room	⋮	

To view details of each audit entry:

1. Go to the required data and mouse over
2. Click .

View the entries that are changed in the details page that is launched. The illustration below shows details of successful disabling of Bot Session on Enterprise Control Room and setting of the password policy:

Audit log > View action

### Edit Settings

< Back

ACTION DETAILS	
Status	Item name
Successful	General configuration settings
Action taken by	Time
admin	2017-12-12 16:26:45 IST
Object type	Action type
Action	Edit Settings
Source device	Source
127.0.0.0	Control Room

EDIT SETTINGS DETAILS		
WHAT CHANGED?	OLD VALUE	NEW VALUE
Bot Session On Control Room	Enabled	Disabled
Password Include Alphabets	No	Yes
Password Include Numbers	No	Yes
Password Include Capital Letters	No	Yes
Password Include Special Letters	No	Yes

- [Configure Credential Vault Connection Mode](#)

Credential Vault is a centralized location for securely storing credential information used by bots.

Related tasks  
[View Audit Details](#)

## Configure Credential Vault Connection Mode

Credential Vault is a centralized location for securely storing credential information used by bots.

As a Enterprise Control Room admin, you can configure the Connection mode that allows you to connect to the Credential Vault using a Master key.

The connection mode is first configured during Enterprise Control Room's initial setup as illustrated below:

You can view the Connection mode details in Settings > Credentials .

Type	Master key
Express	*****

Modified by: System  
Last modified: 15.28.23 2017-10-26 IST

To configure settings for Credential Vault, you have to choose between Express or Manual mode.

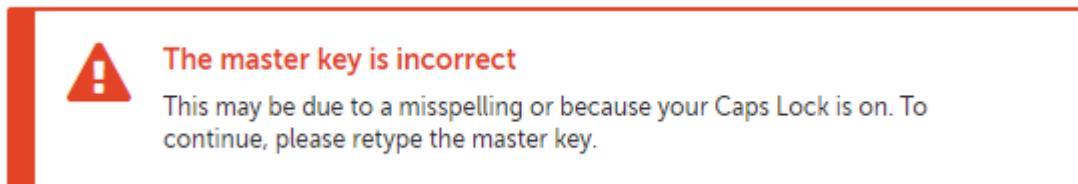
Type	Master key
<input checked="" type="radio"/> Express Save your master key and automatically connect to the Credential Vault every time the Control Room restarts.	*****
<input type="radio"/> Manual Every time the Control Room restarts, manually enter the master key (given to you during installation) to connect to the Credential Vault. More secure and recommended for use in a production environment.	Master key *****

Modified by: System  
Last modified: 16.05.13 IST  
2017-10-05

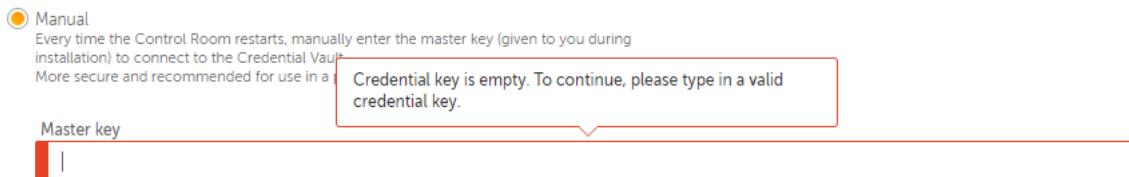
- Express Mode - Use this to auto connect to the Credential Vault with the master key that is stored in the system during Enterprise Control Room configuration.
- Manual Mode - Use this to manually connect to the Credential Vault using the master key that was available during Enterprise Control Room configuration.

Note: You will have to provide this key every time you start or restart the Enterprise Control Room.

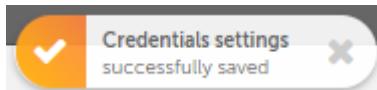
- Compared to Express, the Manual mode is more secure and recommended for use in production environment.
- While switching modes, you must provide the Master Key in the field and click Save for the changes to take effect.
- When you do not enter a valid key, you are shown:



- If the field is empty, you are shown:



- A successful switch is denoted with:



Tip: Restart the server machine (on which the Enterprise Control Room is installed) or services to allow changes to take effect.

## Audit Log

All updates to the Credential Vault connection mode are captured in the Audit Log page. For example, the following illustration lists all actions performed to connect and edit connection settings to the Credential Vault :

## Audit log

Audit log

Actions (23 of 23)								
	Status	TIME	IF	ACTION TYPE	ITEM NAME	ACTION TAKEN BY	SOURCE DEVICE	SOURCE
<input type="checkbox"/>	Unsuccessful	12:15:47 IST 2017-11-13		Edit Settings	Credential Vault settings	admin	127.0.0.0	Control Room
<input type="checkbox"/>	Successful	12:12:48 IST 2017-11-13		Edit Settings	Credential Vault settings	admin	127.0.0.0	Control Room
<input type="checkbox"/>	Successful	11:32:26 IST 2017-11-13		Connect Credential Vault	Express	N/A	127.0.0.0	Control Room

To view details of each audit entry:

1. Go to the required data and mouse over
2. Click

The details page is launched. The illustration below shows details of successful Credential Vault connection switch from Express to Manual mode:

Audit log > View action

### Edit Settings

[< Back](#)

ACTION DETAILS	
Status	Item name
Successful	Credential Vault Settings
Action taken by	Time
admin	2017-11-13 12:12:48 IST
Object type	Action type
Action	Edit Settings
Device	Source
127.0.0.0	Control Room

EDIT SETTINGS DETAILS		
WHAT CHANGED?	OLD VALUE	NEW VALUE
Credential configuration mode	Express	Manual

Related tasks

[View Audit Details](#)

### Email settings

As a Enterprise Control Room admin, opt to send email notifications to other Enterprise Control Room users when certain activities that affect the users are updated such as password change, user information, account activation/deactivation, TaskBot execution status, and so on.

When email notification setting is enabled, all users have to confirm their account by clicking on the confirmation link that they receive in their email account, set the password and security questions, and login to the [Control Room](#).

By default, email notifications are disabled.

Email	
<u>Notifications</u>	
Do not send email notifications	
Modified by System	Last modified 20 21:38 2017-10-16 IST
<a href="#"> Edit</a>	

To modify Email settings:

## Procedure

1. Select Email
2. Click Edit  
The page opens in edit mode.
3. Select Send email notifications
4. Enter the following details:
  - a) Email address - this is the address from which the notification will be sent to the user
  - b) Email server host - this is the email server host name
  - c) Email server port.- this is between 1 and 65535
  - d) Optional: My server uses a secure connection (SSL/TLS) - Select this if you have enabled SSL/TLS protocol
  - e) Username and Password - This is only enabled if you select My server requires authentication
5. Select any or all activities to send notification to the user:
  - a) **11.3.2** User initiates Forgot Password process from Login screen. For example, the user is sent an email notification if the Enterprise Control Room user clicks the Forgot Password link from the login screen.
  - b) The user information changes. For example, when the Enterprise Control Room admin updates the **Firstname**  
and  
**Lastname**  
of user Mike.Lee, he receives an email notification stating that his user account information has been updated.
  - c) The user is activated, deactivated or deleted. For example, if the Enterprise Control Room admin disables the user Mike.Lee, he receives an email stating that his user account has been disabled.
  - d) A TaskBot stops running because it is unsuccessful, to the user who started or scheduled it  
For example, if Mike.Lee who has scheduling privileges schedules a Bot to run on the Bot Runner Amy.Chen's machine and the bot fails to deploy to Bot Runner machine or execute because it was either stopped, timed-out or encountered an error, Mike.Lee receives an email notification stating that the Bot scheduled on the [Bot Runner](#) Amy.Chen could not finish execution.

- e) A BLM package is exported or imported, to the user who performed BLM export or import For example, if Mike.Lee exports or imports a BLM package, he will receive an email notification providing status of the export or import package.
6. Click Save changes  
The settings are saved successfully
    - To disable the notifications clear the Send email notifications option and save changes.
    - All updates to the Email notification settings are captured in the Audit Log page.
  0. To view details of each audit entry go to the required data and mouse over  icon and click the view icon  
View the changed entries in the details page that is launched.

Related tasks

[View Audit Details](#)

## Bots - Configure Version Control

To control edits to files that might include TaskBots, MetaBots, Reports, and Workflows, as a Enterprise Control Room admin you can configure version control in Enterprise Control Room Settings.

The [Control Room](#) is tightly integrated with [Subversion Version Control](#), so that the version, checkin/checkout, version history and version roll-back functionality can be leveraged with ease for all files. By default however, the feature is disabled.

## Version Control Pre-Requisites

- For version control to be enabled and integrated from Enterprise Control Room, it is necessary that SVN should be installed and configured.  
Note: Automation Anywhere supports SVN v1.7.2, v1.9.7, and 1.8.15.
- SVN Administrator user should be created with required permissions.
- SVN repository should be created, which can be used to store all version control files.
- Enterprise Control Room will be the basis of communication with SVN. Automation Anywhere Enterprise clients will not communicate with SVN directly.

Note: After the Enterprise Control Room integration with SVN is up and running, all communication for version control operations from Automation Anywhere Enterprise client to SVN will take place through the Enterprise Control Room only.

## Impact of enabling and disabling version control settings

When you enable and disable version control settings in the Enterprise Control Room, it affects the way a Enterprise client can access their bots in the Enterprise client and upload those to the Enterprise Control Room. While enabling and disabling this setting ensure you are aware about its impact, which is summarized here.

- When you enable version control settings, the system uploads the bots from Enterprise Control Room repository to SVN repository. During upload the Enterprise Control Room repository is in read only mode and locked. Hence, you cannot update it. You will not be able to perform actions such as Upload, Delete, Set production version, Checkout /Check in /Undo checkout, and Force unlock.

- When you disable version control settings, the files that are in checked out state are listed for force unlock by the Enterprise Control Room administrator or a user with unlock bots privileges. You are allowed to disable the settings only when you unlock the checked out files.
  - When you re-enable version control settings, you can:
    - Connect to the repository that you had uploaded earlier. Version history of existing bots is also retained. Hence, in this case,
      1. The version of the bots that are not updated remains the same.
      2. A new version of updated bots is created.
      3. Version 1.0 is allotted to new bots that have the same name as that of a bot that was deleted from the earlier repository.
      4. Production version is not set if the option Do not assign production version. I will do so manually is selected.
      5. Production version is set to latest versions of the bots if the option Automatically assign the latest version of bots to production version is selected.
    - Connect to a new repository that does not have any bots. Your version history of the earlier repository is not retained. Also, you can choose to set the production version manually or automatically.
- Note: You cannot connect to a new repository that is not empty.

All updates to the VCS Settings are captured in the Audit Log page.

- [Enabling Version Control](#)

You can upload the bots from Enterprise Control Room repository to SVN repository by enabling version control settings.

Related tasks

[Enabling Version Control](#)

[View Audit Details](#)

## Enabling Version Control

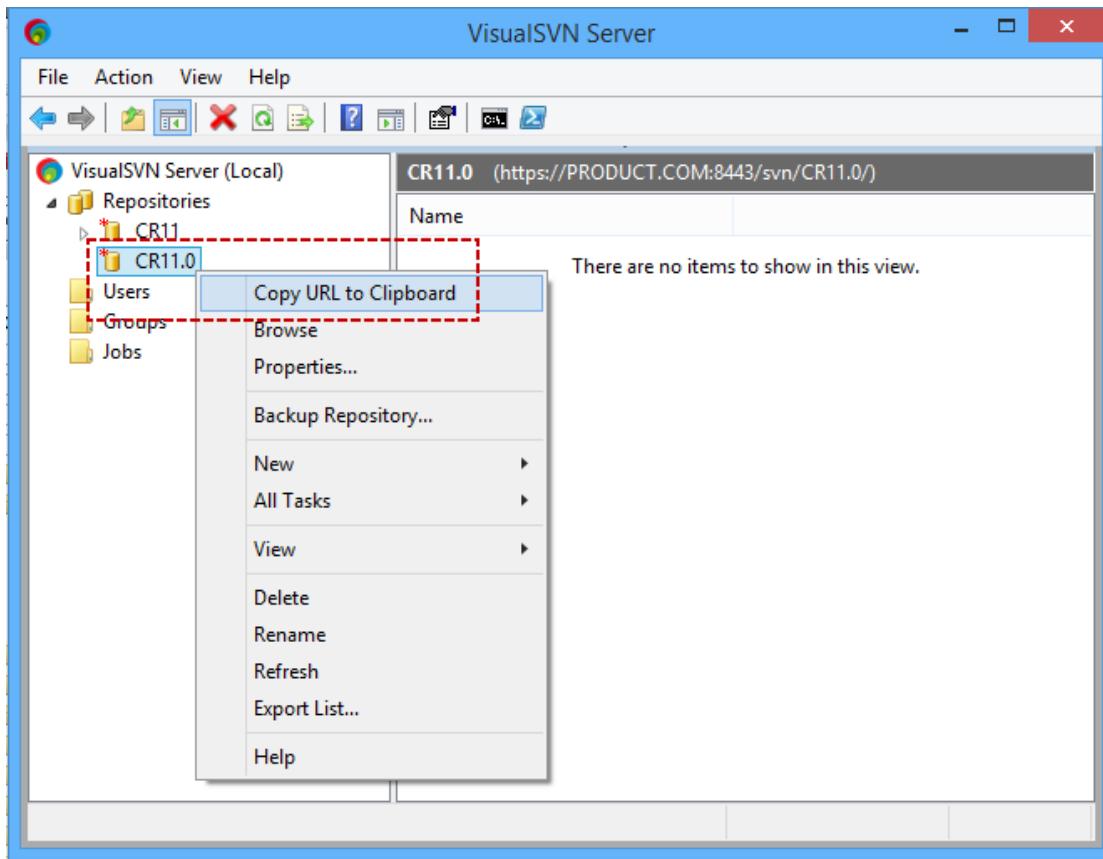
You can upload the bots from Enterprise Control Room repository to SVN repository by enabling version control settings.

To enable version control for bots follow the steps given below:

### Procedure

1. Select Administration Settings Bots
2. Click Edit.  
The page opens in edit mode.
3. Select Enabled.
4. Enter the following details:
  - a) Subversion server name - Provide hostname of subversion server.
  - b) Subversion repository path - Provide the SVN repository path.
    - c) The Subversion repository path is case sensitive. For example, if your repository path is \svn\V11SVNRepo and you enter \SVN\V11SVNRepo, the Enterprise Control Room will not be able to connect to the Subversion Server.
    - d) The SVN repository must be empty if you are enabling these settings or switching from an old configured repository to new SVN repository.

- e) You can configure only upto three levels of repository path.  
Tip: You can copy these details from the VisualSVN Server Manager as shown:



- Select option for assigning bot production version manually or automatically when you enable version control or configure version control to another Subversion repository.  
The production version of a bot is must for a schedule to run on the selected bot, Your schedules will not be triggered unless the scheduled bots have their production versions set.

- Use Do not assign "Production versions." I will do so manually when you want to manually assign a production version for bots. Use this option when you want to set production versions in a controlled manner.
- Use Automatically assign the latest version of a bot to be its "Production version" when you want the Enterprise Control Room to automatically select the latest version of bots to production version.

- Select Connection Type under Server settings.

You can select any of the following protocols to connect to SVN:

- http - This is the default option
- https - This can be selected when the SVN is configured to use the https protocol
- svn+ssh - This option can be selected when the SVN is configured to use the SSH protocol. This option is recommended as it allows for faster and more secure processing of version control operations.

- Provide the Subversion server port number that is assigned for SVN.

Ensure the port number is between 1 and 65535.

- Provide your SVN Login credentials - Username and Password.

The details for Subversion path and Files last uploaded are updated after you configure version control. The default path of Enterprise Control Room files is also displayed.

9. Save changes.

Note:

- If VCS was earlier configured and you switch to a different Subversion repository, the bot version history is not stored. See [Impact of enabling and disabling version control](#) section for details.

Related tasks

[View Audit Details](#)

Related reference

[Bots - Configure Version Control](#)

11.3.2

## Configuring Syslog service

You can configure the Enterprise Control Room so that the Audit Log entries can be exported in the Syslog format to remote Syslog compatible log management servers.

### Prerequisites

Ensure the Syslog servers are configured and ready.

Pushing Audit Log entries to remote Syslog servers enables you to integrate and leverage advance searching and reporting features of security information and event management (SIEM) solutions. To configure server(s) where audit records will be sent in standard Syslog format do the following:

### Procedure

1. Navigate to Administration > Settings > Syslog Service.
2. Click Edit.
3. Click the plus icon.
4. Enter the following Syslog server details.

Name	Description
Syslog Server Hostname	Fully Qualified Domain Name (FQDN) or IP Address of the remote Syslog server to send records.
Port	Port that the remote Syslog server uses to receive incoming Syslog records (for example, 514)
Protocol	Network protocol that the Syslog server uses (TCP or UDP)
Use Secure Connection	Use a TLS encrypted channel to send Syslog records to the remote server.  This option is available for TCP protocol only.

5. Click the plus icon to add more servers and enter server details.
6. Click Save changes.

## Next steps

After you configure the Syslog server(s) in the Enterprise Control Room, each time there is an entry recorded in the Audit Log, a corresponding message is generated and sent to the configured Syslog server. Older entries of the Audit Log will not be available in the Syslog server.

Related concepts

[Settings overview](#)

11.3.2

## Configuring Active Directory Settings

As a Enterprise Control Room administrator you can edit the Active Directory configuration setting to either discover the available domains and sites automatically (auto mode) or manually enter the LDAP URLs (manual mode).

### Prerequisites

Here are some points to consider before you switch from one mode to another:

- If you switch from manual to auto mode, all discovered domains and sites are shown as selected. However, some of the manually entered URLs might be lost during discovery.
- If you switch from auto to manual mode, the previously discovered LDAP URLs will be pre-populated. You can add/remove URLs as required.

To change the configuration mode do the following:

### Procedure

1. Navigate to Administration > Settings > Active Directory.
2. Click Edit.
3. Enter the Domain username and password
4. Select Manually add connections or Discover connections.  
If you select Discover connections, Enterprise Control Room retrieves all domains and sites from all forests to which the domain user has access.  
If you select Manually add connections, previously provided LDAP URLs are shown.
5. Edit the LDAP URLs if you have opted to add connections manually. Or, select/unselect the Domains and sites if you have opted for the Enterprise Control Room to discover connections.  
If you decide to continue with the auto mode, previously selected domains and sites will be shown as selected.  
If only one domain and one site under it is discovered, then it is shown in read-only mode and cannot be edited.
6. Click Save and continue.

In the Active Directory configuration page, if the configured mode is Auto, the configured domains and sites are shown along with the configured URLs. And if the configured mode is Manual, the configured URLs are listed.

Related concepts

[Settings overview](#)

## User management overview

As an Enterprise Control Room administrator, create, view, edit, delete, enable or disable a user. Creating users steps vary depending if the user is in a non-Active Directory, Active Directory, or an Single Sign On user from an IdP server.

The Users page of the Enterprise Control Room gives detailed information of existing users.

### Search Parameters

For ease of access, apply search parameters to Username, First Name, Last Name, Description, User Status, and Email columns.

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.

**Warning:** When you use special keys "-" or "\_", the system lists all Usernames instead of Usernames having these parameters.

### Column Actions

- Click a column header to sort by ascending or descending order.

Sort up to three columns at a time by holding the Shift key as you click on two more column headers. This way the sorting is done on the entire table and not just the data that is currently visible to you.

- Drag and drop column headers to move the column left or right.
- Hover your mouse cursor over the end of a column and drag to re-size.

### Individual User Actions

You can perform the following tasks on an individual User by hovering your mouse over , located to the right of each 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 user details and enable or disable the 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. This is useful when you want to temporarily restrict a user's access.

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 a user leaves the organization or is moved to another role. This frees both the device to which the user was attached and the allocated license.

When you delete a user, an email is sent notifying the user if SMTP is enabled.

## Table-level Actions

You can perform 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 a role](#)

### 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

Enables you to select the columns that you want to show or hide in the table.

- [Create a non-Active Directory user](#)

Add a non-Active Directory user by assigning a role and device license.

- [Create an Active Directory user](#)

Add an Active Directory(AD) user by selecting AD domain, providing AD environment details, and assigning a role and device license. The user must be a part of an AD.

- [Edit Active Directory, non-Active Directory, and IdP user details](#)

Change a user's role, first name, last name, email address, or license. This is useful in scenarios where you may want to change the role of a user, when users forget their password, or when their email address has changed.

- [Add user from IdP server for Single Sign On](#)

The process of adding a user from the IdP server in a Enterprise Control Room that is configured for Single Sign On is similar to creating an active directory user.

- [View user](#)

User details, assigned roles, and general details, such as Last modified, Modified by, Object type, and User type are displayed in read only mode.

- [Delete user](#)

You can set the Allocate a device license to this user? to None if you must free up a user license. This ensures that the user can only access the Enterprise Control Room and not any TaskBots.

## Create a non-Active Directory user

Add a non-Active Directory user by assigning a role and device license.

To create a new user, follow these steps:

## Procedure

1. Login to Enterprise Control Room as an administrator and navigate to Administration > Users.  
The All users page is displayed.
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, do the following:

- a) Enable User: unmark this check box if you do not want the user to be able to login immediately.
- b) Username: Type a unique user name.  
Note: You can use the "@" character to accommodate email user-names.
- c) Description: Type a description for the user. This is optional.
- d) First name: Type the first name for the user. This is optional.
- e) Last name: Type the last name for the user. This is optional.  
Note: The number of characters allowed in First name and Last name is 50.
- f) Password: Type a password for the user. Ensure that you are assigning a password that follows the password policy of your organization.
- g) Confirm password: Type the password again. This should be same to what you typed in the Password field.
- h) Email: Type 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.
- i) Confirm email: Type the email address again. This should be same to what you typed in the Email field.

4. In the Select roles section, assign a role from the Available roles table.

Each role comes with specific privileges and permissions to access and perform actions in certain areas of Enterprise Control Room. See [System created roles](#).

- a) Select the role that you want to assign.  
You can select multiple roles for the user.
- b) Click the  icon to move the roles to the selected column.
- c) To remove a role from the selected column, mark select the role and click the .

Note: View Dashboard, Manage my credentials and locker, View and manage my queues: These permissions are available to any Enterprise Control Room user by default. A non-admin user does not have access to Admin, BotFarm Admin, Pool Admin, Locker Admin roles.

5. Assign a device license to the user. See [System default licenses](#).

Note: Device licenses are not available for users with the Admin or BotFarm Admin roles. The number of available copies are displayed next to each license.

6. Click Create user or Create user and add another.

The new user is displayed in the User table.

Note: If SMTP is enabled, an invite email is sent to new users to login.

#### Related tasks

[Email settings](#)

### Create an Active Directory user

Add an Active Directory(AD) user by selecting AD domain, providing AD environment details, and assigning a role and device license. The user must be a part of an AD.

### Procedure

1. Click Create user.  
The Create user page is displayed.
2. (Optional) Clear the Enable User check box if you do not want the user to login immediately.
3. Click Active Directory domain to assign an active directory name for the user.  
The list displays all the domains available in the [Active Directory](#) domain controller.  
Note: Enterprise Control Room Active Directory supports single forest multi-domain environment.
4. Enter a name in the Username field, and click CHECK NAME IN ACTIVE DIRECTORY.

- If the user name is present in the AD, the First name, Last name, Email, and Confirm email fields are pre-filled. If the data is not pre-filled, enter the details.
  - If the user name is not present in the AD, an error message is displayed. You must contact your network administrator to resolve this issue.
5. In the Select roles section, assign a role from the Available roles table.  
 Each role comes with specific privileges and permissions to access and perform actions in certain areas of Enterprise Control Room. See [System created roles](#).
- a) Select the role that you want to assign.  
 You can select multiple roles for the user.
  - b) Click the  icon to move the roles to the selected column.
  - c) To remove a role from the selected column, mark select the role and click the .
- Note: View Dashboard, Manage my credentials and locker, View and manage my queues: These permissions are available to any Enterprise Control Room user by default. A non-admin user does not have access to Admin, BotFarm Admin, Pool Admin, Locker Admin roles.
6. Assign a device license to the user. See [System default licenses](#).  
 Note: Device licenses are not available for users with the Admin or BotFarm Admin roles. The number of available copies are displayed next to each license.
7. Click Create user or Create user and add another.  
 The new user is displayed in the User table.  
 Note: If SMTP is enabled, an invite email is sent to new users to login.

#### Related tasks

[Email settings](#)

[Mapping Active Directory](#)

### Edit Active Directory, non-Active Directory, and IdP user details

Change a user's role, first name, last name, email address, or license. This is useful in scenarios where you may want to change the role of a user, when users forget their password, or when their email address has changed.

To edit a user's details, follow these steps:

### Procedure

1. Login to Enterprise Control Room as an administrator and navigate to Administration > Users.  
 The All users page is displayed.
2. Move your mouse over the Actions icon  and click the Edit user  icon.  
 The Edit user page is displayed.
3. Make changes to the fields depending on your requirements.
  - You cannot change the User name for a user.
  - You cannot change or edit your own details except from User Profile tray. To change the details of your own profile, see [Edit and update your profile](#).
  - In case when Email Notification is enabled when you edit the details of a user, an email is sent to the user. [Learn more](#).
  - If roles/ permissions for any user is updated, the user must re-login or refresh the browser for the changes to be immediately reflected on Enterprise Control Room UI.
4. Click Save Changes.  
 The changes are made and a successfully edited message is displayed.  
 These changes are audit logged and authorized users can view the logs.

## Related reference

[User management overview](#)

## Add user from IdP server for Single Sign On

The process of adding a user from the IdP server in a Enterprise Control Room that is configured for Single Sign On is similar to creating an active directory user.

## Procedure

1. Log on to Enterprise Control Room with administration privileges.
2. Navigate to the [Users](#) page.  
The Users page is displayed.
3. Click the Create user link.  
The Create user page is displayed.
4. In the General details area, do the following
  - Username: Type a user name for the user. Ensure that the Username is the same as provided in the IdP Server.  
Note: The "@" character is supported to accommodate email user names.
  - Description (Optional): Type a description for the user.
  - First name (Optional): Type the first name for the user.
  - Last name (Optional): Type the last name for the user.

The number of characters allowed in First name and Last name is 50.

- Email: Type the email address for the user. If email setting are 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.
- Confirm email: Type the email address again. This should be same to what you typed in the Email field.

5. In the Select roles section, assign a role from the Available roles table.

Each role comes with specific privileges and permissions to access and perform actions in certain areas of Enterprise Control Room. See [System created roles](#).

a) Select the role that you want to assign.

You can select multiple roles for the user.

b) Click the  icon to move the roles to the selected column.

c) To remove a role from the selected column, mark select the role and click the .

Note: View Dashboard, Manage my credentials and locker, View and manage my queues: These permissions are available to any Enterprise Control Room user by default. A non-admin user does not have access to Admin, BotFarm Admin, Pool Admin, Locker Admin roles.

6. Assign a device license to the user. See [System default licenses](#).

Note: Device licenses are not available for users with the Admin or BotFarm Admin roles. The number of available copies are displayed next to each license.

## View user

User details, assigned roles, and general details, such as Last modified, Modified by, Object type, and User type are displayed in read only mode.

## USER DETAILS

- First name: The first name of the user.
- Last name: The last name of the user
- Description: The description of the user.
- Email: The email address of the user
- Password: The password of the user.

For [Active Directory](#) users, the password field is not displayed.

- User status: The status of the user, whether enabled or disabled.
- License: The license type of the user, such as unattended bot runner, attended bot runner, bot creator and other license types.
- License status: The status of the user license:
  - Verified: Any user created in the Enterprise Control Room.
  - Unverified: If the user has not verified the license (clicked the verification link) when the SMTP is enabled.
  - Registered: When the user logs into any client machine.
- Auto login: If a user can auto-login after logging out.

## Roles

The roles assigned to the user.

## GENERAL DETAILS

- Last modified: Displays the last time changes were made to the user in date and time.
- Modified by: Displays the name of the user who last made changes to the user in date and time.
- Object type: Displays the type of the bot, such as TaskBot, MetaBot, or IQ Bot.
- User type: The type of user, such as [Bot Creator](#), [Unattended Bot Runner](#), Attended Bot runner, Admin or Other.

## Related tasks

[Delete user](#)

[Edit user](#)

[Create user](#)

## Related reference

[Roles overview](#)

[Build](#)

## Delete user

You can set the Allocate a device license to this user? to None if you must free up a user license. This ensures that the user can only access the Enterprise Control Room and not any TaskBots.

## Prerequisites

- There are no active or inactive schedules associated with the user.

If the user has created some schedules which are running or pending for execution you cannot delete the user.

- There are no automation processes running on the registered user device.

- Credential Vault variables associated with the user are deleted.
- The user is not a member of lockers in the Credential Vault.
- The user does not own a queue or a device pool.

Also ensure that the user is not a part of any device pool.

## Procedure

1. Click Delete user.

Use mouse over to click the icon located to the right of the desired user account.

2. Review the message content and click Yes, delete.

The following messages are displayed, depending on the assigned license:

- Attended Bot Runner license

Do you want to permanently delete the user <username>? This will release the Attended bot runner license allocated to the user. There may be one or more schedules created by this user. If you delete this user, those schedules will not run.

- Unattended Bot Runner license

Do you want to permanently delete the user <username>? This will release the Unattended bot runner license allocated to the user and remove the device <devicename> the user has registered with. There may be one or more schedules created by this user. If you delete this user, those schedules will not run.

- Bot Creator license

Do you want to permanently delete the user <username>? This will release the bot creator license allocated to the user and remove the device <devicename> the user has registered with. There may be one or more schedules created by this user. If you delete this user, those schedules will not run.

- None

There may be one or more schedules created by this user. If you delete this user, those schedules will not run.

When you delete a user from the Enterprise Control Room, the bots created by the user are not deleted. The bots that were uploaded by the user, entries in the Historical Activity page, folders created by the user, and so on display the status as Inactive after the user is deleted. However, the user is removed from the User table, the user's license is released. The device name with which the user is registered is removed from the My devices table.

## Roles Overview

Administrator or user(s) with roles permission can Create, Edit, Delete roles for various features and operations in Enterprise Control Room.

RBAC (role based access control) grants access to users based on the assigned roles and the accessibility provided to the user.

## Benefits of creating roles

- Increased security by controlling user access as per their assigned roles.
- Decreased dependency on customer support
- Efficient monitoring of use and access of data, which leads to better research management.

There are two types of roles in Enterprise Control Room:

- System-created: Are pre-configured during Enterprise Control Room installation.
- User-created: Are created by users, and can be customized accordingly. If a custom role /user-created role is created with all Enterprise Control Room permissions, then it is not considered as a Enterprise Control Room Admin role. Only system created Admin role has this privilege.
- Create role: Enables you to create roles. See [Create a Role](#)
- Create user: Enables you to create users in Enterprise Control Room.

In the search pane you can filter roles according to role name and role type.

- When you specify search parameters for the same column, the OR operator is used.
- When you specify search parameters for different columns, the AND operator is used.

Table Item	Description
	View role details. See <a href="#">View a Role</a> .
	Edit a role. See <a href="#">Edit a Role</a> .
	Delete a role. See <a href="#">Delete a role</a> .
	Copy a role. See <a href="#">Copy a role</a> .

Alternately, you can select all roles and perform the following actions:

Table Item	Description
	Refresh the list of roles.
	Delete the selected roles from the list.
	Show or hide specific columns.

Table Item	Description
	<p>By default, all the columns are displayed.</p>

## Audit Logs

All the Create, Update, Delete actions are tracked in audit log for record keeping and future use. You can refer those entries in the Audit Log page.

- [System created roles](#)

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. This topic describes the default roles and their associated permissions.

- [Bot Permissions for a Role](#)

You can assign Bot permissions when creating a role. When you select a folder that means the role will automatically have permission to any bots or files that are added to it in the future.

- [Feature Permissions for a Role](#)

The role based accessibility model ensures that each user has the necessary privileges to view information or data that is relevant to the role assigned by the Enterprise Control Room administrator. Only an admin or Enterprise Control Room user with roles permission can assign roles to users, and provide access for various features and operations.

- [Active Directory Role Mappings](#)

Use the Role Mappings feature to map Active Directory (AD) security groups to one or multiple roles within the Enterprise Control Room. When the security groups are mapped, Enterprise Control Room syncs with AD and assigns the correct roles to the user(s). This provides access to Enterprise Control Room objects (Bots, Folders, Devices, Credentials, Credential Vault Lockers).

- [Mapping Active Directory](#)

You can map a single AD security group to one or more Enterprise Control Room roles. The mapping must be created before user and roles are synced during the user login or background process. While there is a nested grouping relationship in AD, there is no such relationship in Enterprise Control Room as they are all one to one mappings.

- [Create a Role](#)

You can define a role and assign permissions to access various features of the Enterprise Control Room. Only an admin or Enterprise Control Room user with roles permission can assign roles to users and provide access to them for various features and operations.

- [View a Role](#)

An administrator or a user with permission to view and/or manage role can access the View role page.

- [Edit a Role](#)

Only an admin user, or a user with permission to edit role can access the Edit role option and modify information, such as feature permissions, bots, devices and users.

- [Copy a role](#)

An admin user, has permission to copy a role in the Enterprise Control Room. This ensures that user can create similar roles in the system without having to perform the action manually.

- [Delete a role](#)

An admin user, or a user with permission can delete redundant roles from the system.

#### Related concepts

[System created roles](#)

#### Related tasks

[Create a non-Active Directory user](#)

[Create a Role](#)

## System created roles

When planning your Automation Anywhere deployment, consider the licensing, roles, and users required to perform the Automation Anywhere functions. This topic describes the default roles and their associated permissions.

Access to Automation Anywhere functions is defined by a combination of licensing applied to the Enterprise Control Room and the roles assigned to the user.

System created roles are pre-configured during Enterprise Control Room installation. These roles cannot be deleted or edited. You can only assign or unassign these roles to users.

Default Roles	Description
AAE_Admin	Permits 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	Permits users to upload and download TaskBots in the My Tasks folder. Limited access to other features.

Default Roles	Description
AAE_Bot Insight Admin	<p>Permits users to view and manage data in Bot Insight. Limited access to Enterprise Control Room features. (If Bot Insight license is installed).</p> <p>It 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.</p>
AAE_Bot Insight Consumer	Permits users to view data in Bot Insight and limited access to Enterprise Control Room features. (If Bot Insight license is installed)
AAE_Bot Insight Expert	Permits users to manage data in Bot Insight and limited access to Enterprise Control Room features. (If Bot Insight license is installed)
AAE_Bot Store Consumer	Permits users to download a bot package or a Digital Worker from the Bot Store to the Enterprise Control Room repository.
AAE_BotFarm Admin	Permits users access to BotFarm admin privileges.
AAE_BotFarm Agent	Permits users to view and manage privileges to the user.
AAE_IQ Bot Admin	Permits users to access the IQ Bot admin privileges.
AAE_IQ Bot Services	Permits users to access the IQ Bot console and limited access to Enterprise Control Room features.
AAE_IQ Bot Validator	Permits users to access the IQ Bot Validator screen and limited access to Enterprise Control Room features. (For a Bot Runner with an IQ Bot license)
AAE_Locker Admin	<p>Permits users to view all credentials and all lockers. A Locker Admin 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.</p> <p>Note: This permission is not applicable to Enterprise Control Room Admin role.</p>
AAE_MetaBot Designer	<p>Permits users to access Bot Creator MetaBot Designer from Enterprise client but does not allow the user to see any bots and/or supporting files.</p> <p>Note: Migrated users (Bot Creator) who had access to MetaBot Designer in Enterprise Control Room 11.1 and less shall continue to have access to Designer.</p>
AAE_Pool Admin	<p>Permits users to view and manage all device pools.</p> <p>Note: Users with AAE_Pool Admin do not have permission to see any bots and supporting files.</p>

Default Roles	Description
AAE_Queue Admin	Permits users to view and manage all queues.

Note:

- Bot Insight, BotFarm, and IQ Bot roles are displayed only if you have respective licenses.

Related tasks

[Create a non-Active Directory user](#)

## Bot Permissions for a Role

You can assign Bot permissions when creating a role. When you select a folder that means the role will automatically have permission to any bots or files that are added to it in the future.

## TaskBots and other supporting files

You can select from the following permissions:

- Select all - This permission includes upload, download, execute, delete, Run + Schedule actions.
- Run + Schedule - This permission includes run and schedule permission for TaskBots i.e. allows user to run and/or schedule bots. This permission is enabled only if user has either Run my bots or Schedule my bots to run permission.
  - This permission is termed as Run when the user has 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.
  - Similarly, 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.
  - It is termed as Run + Schedule when user has both feature permissions. This allows the user to run and schedule bots that belong to this specific folder on which the permission is selected.
- Upload: This permission allows uploading TaskBot files/ folder to Enterprise Control Room from Client.
- Download: This permission allows downloading TaskBot from Enterprise Control Room.
- Delete: This permission allows removing files and its dependencies from Enterprise Control Room.

## MetaBots

MetaBot supports role based access control (RBAC) on individual MetaBot files, and folders containing MetaBots. When a MetaBot is uploaded to Enterprise Control Room, it inherits permission of the immediate parent folder. To change or modify permission on individual MetaBot file, you must perform the action manually.

Note: If the applied permissions are different on a MetaBot file and its folder, precedence is given to permission applied at the MetaBot file level.

More information on the permissions are as follows:

- Select all - This permission includes upload, download, execute, delete, run + schedule actions.
- Run + Schedule - This permission includes run and schedule permission for MetaBots i.e. allows user to run and/or schedule MetaBots. This permission is enabled only if user has either Run my bots or Schedule my bots to run permission.

- This permission is termed as Run when the user has 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.
- Similarly, 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.
- It is termed as Run + Schedule when user has both feature permissions. This allows the user to run and schedule bots that belong to this specific folder on which the permission is selected.
- Upload - This permission includes uploading MetaBot files/ folder to Enterprise Control Room.
- Download - This permission includes downloading MetaBot files/ folder from Enterprise Control Room to Client.

If download permission is selected then execute permission is auto-selected.

- Execute - This permission includes using MetaBot in a task.
- Delete - This permission includes removing file/ folder from Enterprise Control Room.

## Create role

[Cancel](#) [Create role](#)

**FEATURES**

Name  
+ HR

Features  
+ DASHBOARDS  
+ ACTIVITY  
+ BOTS  
+ DEVICES  
+ WORKLOAD

**BOTS**

**DEVICES**   
+ Devices selected (0)

**USERS**   
+ Users selected (0)

**Which bots and supporting files?**

Users with this role will have access to the Bots tab. Please select the permissions they will have. Selecting a folder means that the role will automatically have permission to any bots or files that are added to it in the future.

This step is optional. You can add this information later.

**TASK BOTS AND OTHER SUPPORTING FILES**  **META BOTS**

If a user has only the Execute (and not the Download) permission, they can download the Meta Bot to the client, and run it in a Task Bot, but cannot edit it.

If a user has the Download permission, they also must have the Execute permission. In addition to the Execute permissions, the Download permission allows the user to edit the Meta Bot.

Folder (1)	Select All	Run + Schedule	Upload	Download	Client UI Permissions	Execute	Delete
<div style="margin-bottom: 5px;"> <span style="font-size: small;">▼</span> <span style="font-size: small;">My MetaBots</span> <div style="margin-left: 10px;"> <span style="font-size: small;">▼</span> <span style="font-size: small;">Inventory Management</span> <div style="margin-left: 10px;"> <span style="font-size: small;">* Create Vendor Logic.mbot</span> <span style="font-size: small;">* Import Dataset.mbot</span> <span style="font-size: small;">* inFlow - all applications.m...</span> </div> </div> </div>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

[< Back](#) [Next >](#)

Note: The Run + Schedule permission replaces the earlier behavior of 11.0 where user was allowed to run or schedule a bot when the user had download permission for a folder.

Related tasks

[Create a Role](#)

## Feature Permissions for a Role

The role based accessibility model ensures that each user has the necessary privileges to view information or data that is relevant to the role assigned by the Enterprise Control Room administrator. Only an admin or Enterprise Control Room user with roles permission can assign roles to users, and provide access for various features and operations.

The option you select for users, determines the features accessible to them. You can assign the following permissions:

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Features	Permissions
DASHBOARDS	<p>View dashboards Selected by default as it is available to all the users. Note: The data populates in the dashboard based on the role permissions.</p>
ACTIVITY	<ul style="list-style-type: none"> <li>• View my In progress activity Selected by default and enables all the users to view their own activity.           <ul style="list-style-type: none"> <li>• Manage my In progress activity Enables you to monitor and manage (pause, resume and cancel) your own In progress activities. You can also move your finished activities to the history.</li> <li>• View everyone's In progress activity Enables you to monitor those In progress automations for which the run or schedule access on the respective taskbots are available.               <ul style="list-style-type: none"> <li>• Manage everyone's In progress activity Enables you to monitor and manage (pause, resume and cancel) other user's In progress activities. You can also move your finished activities to the history.</li> </ul> </li> <li>• View my scheduled bots Enables you to view their bots, even if they are scheduled to run later or by others.               <ul style="list-style-type: none"> <li>• Schedule my bots to run Can schedule a bot on which the user has 'Schedule' privileges.</li> <li>• Edit my scheduled activity Can edit the schedules that the user has created.</li> <li>• Delete my scheduled activity Can delete the schedules that the user has created.</li> <li>• View and manage ALL scheduled activity from my Folders Can view, edit, and delete all the schedules on the bots from the folders that the user has access to. These schedules may also be created by other users.</li> </ul> </li> </ul> </li> </ul>

Features	Permissions
	<ul style="list-style-type: none"> <li>• View and manage ALL scheduled activity Can view, edit, and delete all the schedules in the system.</li> </ul>
BOTS	<ul style="list-style-type: none"> <li>• View my bots</li> <li>• Run my bots Can run the bots from the folder on which the user has 'Run' permission.</li> <li>• Export bots Can create a bot package to export bots and their dependencies. This requires download permission.</li> <li>• Import bots Can import a bot package. This requires upload permission.</li> <li>• Create Folders Can create folders in the Enterprise Control Room repository.</li> <li>• Rename Folders Can rename folders in the Enterprise Control Room repository</li> <li>• Manage my credentials and lockers Selected by default as it is available to all the users.           <ul style="list-style-type: none"> <li>• Manage my lockers Can manage the lockers that the user has created or owns.</li> <li>• Administer ALL lockers Can view and manage all the lockers and is available only with the AAE_Locker Admin role.</li> </ul> </li> <li>• Create standard attributes for a credential Can create the Standard attributes for a credential in addition to the User-provided attributes.</li> <li>• View and edit ALL credential attributes value Can view and edit all the credential attributes that the user has created or owns in the Enterprise Control Room. Also, can use the Credential Vault API to edit other users' attributes.</li> </ul>

Features	Permissions
	<ul style="list-style-type: none"> <li>• Bot Auto-Login Credentials API</li> </ul> <p>Can set the auto-login credentials of a Bot Creator or Bot Runner through the Bot Auto Login credentials API. See <a href="#">Enterprise Control Room API to manage bots login credentials</a>.</p>
MetaBot	<ul style="list-style-type: none"> <li>• Access to MetaBot Designer</li> </ul> <p>Enable Bot Creators to access MetaBot Designer to view, create and update MetaBots. This permission is available by default for the system role AAE_MetaBot Designer and it is disabled for other roles (System and User created).</p>
DEVICES	<ul style="list-style-type: none"> <li>• View and manage my Bot runners, Bot creators and device pools</li> </ul> <p>Enables you to view, run and schedule bots on the devices and/or the device pools.</p> <ul style="list-style-type: none"> <li>• Create device pools</li> </ul> <p>Can create and manage one or more device pools.</p> <ul style="list-style-type: none"> <li>• Administer ALL device pools</li> </ul> <p>Can manage all pools in the system and is available only with the AAE_Pool Admin role.</p> <ul style="list-style-type: none"> <li>• View and manage BotFarm</li> </ul> <p>This permission is currently not in use.</p>
WORKLOAD	<ul style="list-style-type: none"> <li>• View and manage my queues</li> </ul> <p>Enables you to view, create, and manage the queues that the user has created.</p> <ul style="list-style-type: none"> <li>• Create queues</li> </ul> <p>Can create and manage one or more queues.</p> <ul style="list-style-type: none"> <li>• Administer ALL queues</li> </ul> <p>Can manage all queues in the system and is available only with the AAE_Queue Admin role.</p> <ul style="list-style-type: none"> <li>• SLA Calculator</li> </ul>

Features	Permissions
	<p>Can calculate the number of bot runners or the time-frame required to process all the work items in a queue.</p>
BOT STORE	<ul style="list-style-type: none"> <li>View Bot Store</li> </ul> <p>Enables you to access the Bot Store tab in the navigation pane of the Enterprise Control Room. Selected by default as it is available to all users.</p> <ul style="list-style-type: none"> <li>Download Bot Store bots to the Enterprise Control Room repository</li> </ul> <p>Enables you to download bots from the Bot Store to the Enterprise Control Room repository and is available only with the AAE_Bot Store Consumer role.</p>
AUDIT LOG	<ul style="list-style-type: none"> <li>View everyone's audit log actions</li> </ul> <p>Enables you to view everyone's action in the audit logs in addition to your own.</p>
ADMINISTRATION	<ul style="list-style-type: none"> <li>View and manage settings</li> </ul> <p>Enables you to view and manage all the Enterprise Control Room settings.</p> <ul style="list-style-type: none"> <li>View users</li> </ul> <p>Enables you to only view all the users in the system.</p> <ul style="list-style-type: none"> <li>Create users</li> </ul> <p>Can create one or more users in the system.</p> <ul style="list-style-type: none"> <li>Edit users</li> </ul> <p>Can edit one or more users in the system.</p> <ul style="list-style-type: none"> <li>Delete users</li> </ul> <p>Can delete other users.</p> <ul style="list-style-type: none"> <li>11.3.2 View roles</li> </ul> <p>Enables you to only view roles.</p> <ul style="list-style-type: none"> <li>Manage roles</li> </ul>

Features	Permissions
	<p>Can manage (create, edit, and delete) roles in addition to viewing.</p> <ul style="list-style-type: none"> <li>• View and manage Migration</li> </ul> <p>Enables you to view migration details and is able to create or manage an existing migration.</p> <ul style="list-style-type: none"> <li>• View licenses</li> </ul> <p>Enables you to view the license details.</p> <ul style="list-style-type: none"> <li>• Manage user's device licenses</li> </ul> <p>Can manage licenses for other users.</p> <ul style="list-style-type: none"> <li>• Install licenses</li> </ul> <p>Can install licenses for other users.</p>
API	<ul style="list-style-type: none"> <li>• Bot Insight Data API</li> </ul> <p>Enables you to use the Bot Insight data API. See <a href="#">Bot Insight Data API</a>.</p> <ul style="list-style-type: none"> <li>• <b>11.3.2</b> Generate API-Key</li> </ul> <p>Enables you to generate an API key used for authenticating the Enterprise Control Room user when making an authentication API call. The permission is not available by default and has to be assigned to a user defined role separately.</p>
IQ BOT	<ul style="list-style-type: none"> <li>• View IQ Bot</li> </ul> <p>Enables you to view all the default dashboards in the IQ Bot portal.</p> <ul style="list-style-type: none"> <li>• View Learning Instances</li> </ul> <p>Can view all the learning instances.</p> <ul style="list-style-type: none"> <li>• View Domains</li> </ul> <p>Can view all the domains in the IQ Bot portal.</p> <ul style="list-style-type: none"> <li>• View Administration</li> </ul> <p>Can view the administration tab in the IQ Bot portal.</p>

Features	Permissions
	See <a href="#">User roles and permissions</a> for more information about IQ Bot feature permissions.

Related tasks

[Create a Role](#)

## Active Directory Role Mappings

Use the Role Mappings feature to map Active Directory (AD) security groups to one or multiple roles within the Enterprise Control Room. When the security groups are mapped, Enterprise Control Room syncs with AD and assigns the correct roles to the user(s). This provides access to Enterprise Control Room objects (Bots, Folders, Devices, Credentials, Credential Vault Lockers).

1. In the Enterprise Control Room, click ADMINISTRATION > Roles.
2. Click ACTIVE DIRECTORY ROLE MAPPING tab.

You can use this section to add various role mappings in Enterprise Control Room. See [Mapping Active Directory](#).

## Syncing user roles

Based on the mapping information, user roles are assigned in multiple ways:

1. User creation.

All the security groups that a user belongs to in AD are retrieved and roles are automatically assigned to that user based on the mappings.

2. User login.

Everytime a user logs in, the Enterprise Control Room validates the mappings, the current security group memberships and assigned roles, before confirming any required changes.

3. Automated background process.

This process is initiated based on the defined time period set on the Active Directory role mappings page. It syncs all the mappings, before syncing roles for every user in the Enterprise Control Room based on the updated mappings.

Note: As this can be a time consuming and an expensive operation, it is recommended that you set the role synchronization time period to a minimum of 1440 minutes (1 day).

You can use the Cancel Sync button to turn off the periodic automatic sync. This process can then be triggered manually using the Sync roles from Active Directory option, which starts immediately and continues to run based on the time interval set.

All the roles assigned through role mappings are designated as 'System assigned roles'. The Enterprise Control Room admin can assign additional roles to user(s) if required. However, the 'System assigned roles' of the user(s) cannot be removed.

Note: The 'System assigned roles' can be changed or removed only from mappings.

## Viewing role mappings

All the available role mappings are listed in the Role Mapping table.

1. Enter an available mapping name in the search box next to the Mapping Name drop-down. (Optional)  
You may also use the Active Directory security groups to search for any available AD security groups.

Any available role mapping(s) that matches your search criteria is displayed in the Role Mapping table.

2. Click the  icon to view the available options for the selected role mapping.
3. Click the .

All the associated MAPPING DETAILS and Mapped Roles are listed.

4. (Optional) Click the  icon to remove an existing role mapping.

## Syncing role mappings

You can sync the role mappings from the Active Directory role mappings page, or automate it to sync when the user role sync background process is triggered.

Note: Nested mapping is currently not supported.

For example, assume that an AD has a parent group and a child group called 'pGroup' and 'cGroup' respectively. A user called '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.

As only direct mapping is supported in the Enterprise Control Room, 'Paul' is automatically mapped to only role1 and role2.

The role mappings must be synced during the following scenarios:

1. Changes to AD groups.

If any group(s) that is mapped is deleted from the AD, the mappings must be validated before being deleted as the group(s) is no longer available.

2. Update to the license file.

Updating the license file can change the available roles. Mappings must be synced before updating the roles.

Note: After a sync, user must wait for a second or two for the updated changes to appear.

## Conflicting roles

There are some roles in the Enterprise Control Room that cannot co-exist due to certain restrictions. For example, an error appears if you assign an Enterprise Control Room user with an Admin role, along with one of the following roles:

- AAE\_Bot Insight Admin
- AAE\_Bot Insight Consumer
- AAE\_Bot Insight Expert

This validation also applies to the system scheduled sync process of user and roles. In the above scenario, the roles sync for that particular user is ignored, before proceeding to the next user.

An audit log is captured in the system logs when:

- A mapping is created or deleted.
- A role sync is triggered from either a user login or by the background process.

All role syncs are audited.

- There are role conflicts.

Additionally, user roles will not sync for the following scenarios even if the system scheduled process is triggered:

- There are role conflicts in the combination of mappings and user assigned roles, or just in the mapping itself as these are not validated when mapping is created.
- If a mapping was deleted and associated user(s) has no other roles assigned.

A user must have at least one role (no empty roles) for a successful sync.

Note: A user's AD security group cannot be retrieved if there is no url(s) with the same domain.

For example, assume that the Enterprise Control Room has the following urls configured:

- 'ldap://host.domainA.com'
- 'ldap://host.domainB.com'

If a user with 'user@domainC.com' tries to login, no AD security group is returned as there is no url with 'domainC.com'.

## Mapping Active Directory

You can map a single AD security group to one or more Enterprise Control Room roles. The mapping must be created before user and roles are synced during the user login or background process. While there is a nested grouping relationship in AD, there is no such relationship in Enterprise Control Room as they are all one to one mappings.

1. Click Administration > Roles.
2. Click ACTIVE DIRECTORY ROLE MAPPING.
3. Click Create Role Mapping.

This enables you to create a mapping between an existing AD security group and the available Enterprise Control Room role.

4. Enter a name for your mapping in the Mapping name field.
5. Click the Active Directory domain drop-down, and select an available domain.
6. Use the Active Directory security group field to search for a group.

For example, if you have a group named 'Certified Publishers', search for 'Certified'. All the groups with the word 'Certified' in their name are listed under GROUPS.

7. Click the  icon to add the selected group.

8. Use the Available Roles to assign a role.

You can also use the Search name field to search for an available role.

9. Select the role(s) you want to assign, and click the  icon to add it.

The selected roles are listed under the Selected field.

10. Click Create Mappings.

## Create a Role

You can define a role and assign permissions to access various features of the Enterprise Control Room. Only an admin or Enterprise Control Room user with roles permission can assign roles to users and provide access to them for various features and operations.

To create a role, follow the steps mentioned below:

## Procedure

1. Go to Administration > Roles.
2. Click Create Role.
3. Enter the name and description for the role.
4. Select the features and required permissions that are relevant to the role you are creating.

For the available permissions for each feature, see [Feature Permissions for a Role](#).

5. Click Next.

6. Optional: In the Bots tab, assign the permissions with respect to TaskBots and MetaBots.

bots tab is visible only if 'View my bots' permission is selected in the Features tab.

See [Bot Permissions for a Role](#) for more information.

**FEATURES**

- Name: HR
- Features:
  - DASHBOARDS
  - ACTIVITY
  - BOTS
  - DEVICES
  - WORKLOAD

**BOTS**

**DEVICES**

**USERS**

**Which bots and supporting files?**

Users with this role will have access to the Bots tab. Please select the permissions they will have. Selecting a folder means that the role will automatically have permission to any bots or files that are added to it in the future.

This step is optional. You can add this information later.

**TASK BOTS AND OTHER SUPPORTING FILES** **META BOTS**

If a user has only the Execute (and not the Download) permission, they can download the Meta Bot to the client, and run it in a Task Bot, but cannot edit it.

If a user has the Download permission, they also must have the Execute permission. In addition to the Execute permissions, the Download permission allows the user to edit the Meta Bot.

Folder (1)	Select All	Run + Schedule	Upload	Download	Client UI Permissions	Execute	Delete
My MetaBots	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Inventory Management	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Create Vendor Logic.mbot	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Import Dataset.mbot	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
inFlow - all applications m...	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

< Back **Next >**

7. Click Next.

8. In the Devices tab, select the devices your role will have access to.

A non-admin user has access to Bot Runners that are tagged to user's role.

9. In the Users tab, assign your role to the existing users and click the icon.

Users deactivated by the Admin cannot be selected.

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.

10. Click Create role.

#### Related concepts

[Bot Permissions for a Role](#)

[Feature Permissions for a Role](#)

## View a Role

An administrator or a user with permission to view and/or manage role can access the View role page.

## Procedure

1. Click Administration > Roles

Select a role you want to view.

2. From the actions list, click View Role.

Choose one of the following read-only options:

- Features: List of features and permissions the role can access.
- Bots: List of bots and supporting files the role can access.
- Devices: List of devices the role can access.

- Users: List of users having access to the respective role.

Note: A user with View and Manage Role permission can view all the roles. However, the user cannot view details of Admin and Locker Admin roles. If the user clicks the  icon, the view page appears with an error.

## Edit a Role

Only an admin user, or a user with permission to edit role can access the Edit role option and modify information, such as feature permissions, bots, devices and users.

When you click  for a role in the Roles table of the All roles page, the Edit role page is opened.

Note: If a role/ permission for a user is updated, the user must re-login or refresh the browser for the changes to be immediately reflected on Enterprise Control Room UI.

## Procedure

1. Go to Administration > Roles
2. In the roles list, choose the role. Then mouse over to the Actions list and click Edit role.
3. In the Edit role page, user can make changes:

- Features: Allows you to add or revoke role permissions.
  - Bots: Allows you to add or revoke access to folders on the bots tab. Also, you can select the actions a user can perform on files within the folder.
  - Devices: Allows you to add or remove devices a role has access to on the Devices tab.
- Note: If a bot is scheduled on a device, the device is shown disabled in the "selected" area.

- Users: Allows you to add or remove users who have permission to access the role.

4. Click Save changes. Your role is successfully edited.

Note: A user with View and Manage Role permission can view all the roles. However, the user cannot edit details of Admin and Locker Admin roles. When the user clicks , the following message is displayed:

**You do not have permission to edit the Admin role.**

Because you are not a member of the Admin role, you cannot edit it.  
To make changes to the system-created Admin role, please contact your system administrator.

[Close](#)

## Copy a role

An admin user, has permission to copy a role in the Enterprise Control Room. This ensures that user can create similar roles in the system without having to perform the action manually.

To copy a role, follow the steps mentioned below:

## Procedure

1. Go to Administration > Roles
2. From the roles list, choose the role. Mouse over to the actions list and click Copy role.  
Note: System-created roles cannot be copied. These roles are pre-configured during Enterprise Control Room installation.

Type	Role Name	# of Users	Last Modified	Modified By	Action
User-created	HR	1	15:14:11 PT 2018-01-22	admin	<a href="#">Copy role</a>

A new role page is launched, wherein the role is created with "copy" appended to the Role Name.  
Example: In the previous image, role "HR" is copied, so a new role "HR\_copy" is created. All the permissions that were selected are pre-filled in the new role.

3. Click Save changes.  
A success notification is displayed.

## Delete a role

An admin user, or a user with permission can delete redundant roles from the system.

To delete a role, follow the steps mentioned below:

## Procedure

1. Go to Administration > Roles
2. From the roles list, choose the role. Then mouse over to the actions list and click Delete role.  
Note: System-created roles cannot be deleted.
3. Click Yes, delete to delete your role and No, cancel to cancel deletion
4. To delete multiple roles, check the roles and click Delete Checked Items icon.

## Licenses - an overview

The Enterprise Control Room License page provides detailed information about the current license that is installed. It also enables the Admin user to monitor license details and usage statistics.

Therefore, an Admin user can view these details any time and avail information about the number of products purchased, the number of device licenses purchased, and number of licenses that are exactly in use.

### Product licenses

Enterprise Control Room integrates with other Automation Anywhere products such as BotFarm, Bot Insight and Cognitive Platform. The product license details shows the list of purchased products, along with license version and product license status as used, not used, or N/A.

If you have a Bot Insight license, Business Analytics is available by default with Enterprise Control Room v11.0 and later.

Column	Value
Type	Product Name
Version	Latest version number of the current installed product
Purchased	Product has been "purchased" or "not purchased"
Used	Product is in "used", "not used", or "N/A" status

### Device licenses

Bot user license detail shows the number of device licenses that have been purchased and are currently in use.

Bot Creator (Development): Users with privilege to automate bot(s) in Enterprise client.

Bot Runner

- Attended Bot Runner(Runtime): Users with privilege to run bot(s). Users with an Attended Bot Runner license can run bots only on their workstations using the Enterprise client. These users can also make use of local schedules and triggers for time or event based automation.
- Unattended Bot Runner(Runtime): Users with an Unattended Bot Runner license can perform all automation tasks that Attended users can perform. Additionally, this license can also be used for Enterprise Control Room deployment, centralized scheduling, and API based deployment.
- IQ Bots: Users with an IQ Bot license can run IQ Bots within the parent TaskBots. The IQ Bot licenses 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 and/or Attended Bot Runners. But the total licenses distributed to Unattended and Attended Bot Runners cannot exceed 50.

BotFarm (Runtime): bot user count of licenses is measured in number of hours used by all runtime clients within BotFarm to execute a bot.

Bot Insight: It shows the number of user count having Business Analytics role - Bot Insight Consumer or Expert. And API count is measured in number of rows that the API fetches from the Bot Insight database.

Column	Value
Type	Type of license
Purchased	No. of licenses purchased
Used	No. of licenses in use

- [Installing a license](#)

A Enterprise Control Room administrator or a user with license management permission can install a license and evaluate the latest version.

#### Related tasks

[Installing a license](#)

[How to change license service port](#)

### Installing a license

A Enterprise Control Room administrator or a user with license management permission can install a license and evaluate the latest version.

A [Trial license](#) is valid for 30 days. Once it expires, you cannot access the Enterprise Control Room. Contact the System Administrator or Automation Anywhere Sales to purchase a new license. To install a license:

### Procedure

1. Login to the Enterprise Control Room as an Administrator, and select Administration > Licenses.
2. Click Install license or you can click Show details on the notification bar in the Enterprise Control Room header, then click Install a new license.
3. Click Browse to select a .license file from the list of licenses.
4. Click Install license.

An error occurs when:

- A user has an invalid or an expired license file.
- A user selects a file with a different extension other than .license.
- A user selects a file that has been deleted or moved to another location.

### Next steps

Enterprise Control Room installation and configuration is complete. Proceed to [Preparing for users](#).

- [Trial license](#)

Automation Anywhere Enterprise Control Room ships trial License with an evaluation period of 30 days. Use a trial license to assess the product and make an informed purchasing decision.

- [How to change license service port](#)

The Automation Anywhere Enterprise Control Room default license service port is 8080. If the port is busy or blocked, for example, due to a firewall between the license server and clients, you have the option to change the license service port.

#### Related concepts

[Licenses - an overview](#)

#### Related tasks

[Logging in to Enterprise client](#)

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Related reference

[Trial license](#)

## Migration overview

Migration is moving data using a systematic and phased process from Automation Anywhere v10.x to v11.x.x. As an Enterprise Control Room administrator with View and Manage Migration permissions, use the Migration Wizard tool to migrate data.

Complete the migration process from the Enterprise Control Room v11.x.x interface by doing the following steps:

**Step 1: Plan migration**

As an Enterprise Control Room administrator, use the considerations to understand your current environment and then create a migration plan.

**Step 2: Prepare for migration**

Prepare the environment at the source and destination Enterprise Control Room. This involves ensuring access to applications in the source Enterprise Control Room, installing and setting up the destination Enterprise Control Room, other configuration setting changes in both, and more.

**Step 3: Start migration wizard.**

Start the Migration wizard from the Enterprise Control Room interface..

**Step 4: Connect to source Control Room database**

Provide the source Enterprise Control Room database setting and configuration details.

**Step 5: Connect to source Bot Insight database**

If installed, provide the source Enterprise Control Room Bot Insight database setting and configuration details.

**Step 6: Select migration type**

Choose to migrate data from your source Enterprise Control Room based on roles, users, or bots.

**Step 7: Select entities for migration**

Select one of the following options:

- **Roles** - Migrate all or selected roles from the source to the destination Enterprise Control Room. When you select roles, other related data, for example, licenses, users, credentials, historical activity, and schedules are also migrated.
- **Users** - Migrate all or selected users from the source to the destination Enterprise Control Room. When you select users, other related data, for example license, roles, credentials, bots, historical activity, and schedules are also migrated.
- **Bots** - Migrate all or selected bots from the source to the destination Enterprise Control Room. When you select the bots, schedules associated with the bots are also migrated.

**Step 8: Verify data and migrate**

Review and confirm data related to the selected roles, users, and/or bots, with the dependent or associated data, for example MetaBots, schedules, credentials, and so on.

**Step 9: Analyze migration status**

Analyze the results after the migration process completes to track missing or incomplete data and decide if the migration process must be rerun.

Depending on the results repeat Steps 6, 7, and 8.

You can switch to another migration type in subsequent migration runs.

**Step 10: Complete post-migration activities**

After all intended entities are migrated, do the post-migration tasks before using the v11.x.x Enterprise Control Room.

## Plan migration

As an Enterprise Control Room administrator, use the considerations to understand your current environment and then create a migration plan.

Before planning your data migration, review the following considerations:

- If you are using a version lower than 10 LTS, migrate to 10 LTS using the 10 LTS Migration utility and then migrate from 10 LTS to 11.x.x.  
Note: The hot fixes on 10 LTS are supported for migration to 11.2.
- If you are using Automation Anywhere Enterprise v10.2, migrate to either Automation Anywhere Enterprise v10 LTS or Automation Anywhere Enterprise v10 SP2 using the Automation Anywhere Enterprise Migration utility before migrating to v11.x. This also ensures MetaBots created in Automation Anywhere Enterprise v10.2 or lower are compatible.
- You cannot migrate from Automation Anywhere v9.x. First migrate from v9.x to v10 LTS. See the Control Room Installation section of the AAE 10 LTS Installation Guide and the Migrating Data from 9.x to 10.3.0 section in the AAE 10 LTS Data Migration Utility - User Guide.
- Migration from 11 GA (11.0) to 11.2 is not supported.
- You cannot migrate data from a source Enterprise Control Room configured for one user type to a destination Enterprise Control Room configured for another user type. For example, data for an Enterprise Control Room configured for [Active Directory](#) cannot be migrated to Enterprise Control Room with either Non Active Directory or [Single Sign On](#) users.
- [SAML](#) configuration data migration is not supported.
- Automation Anywhere Licensing service should be running on port 8080 by default, which can also be changed, see [How to change license service port](#).
- Automation Anywhere Licensing service must be running under a domain user account.
- The domain user account used for Automation Anywhere Licensing service should have access to Enterprise Control Room v10.x\* repository path using a shared drive.
- The Subversion repository is different in both source and destination Enterprise Control Room. The status of version control is the same in both Enterprise Control Rooms. If it is enabled in the source Enterprise Control Room, manually configure version control in the destination Enterprise Control Room using a Subversion repository that is independent/separate from the 10.x version.
- Create a new unused database for 11.x. You cannot use the 10.x database for 11.x.
- Do the database migration after the platform upgrade.
- Migration of data includes the following:
  - Application settings
  - Automation bots with version history, if applicable
  - Automation schedules (migration of schedules from different time zones is not supported)
  - Bot Insight data
  - Metadata in database
  - Repository data
  - System-defined credentials
  - Users, roles, licenses, and permissions
  - [11.3.3](#) Historical Activity
- Migration of data excludes the following:
  - Audit logs
  - Devices/Clients
  - License information of the source Enterprise Control Room
  - Schedule history
  - User-defined credentials
  - Version control settings

Use the following specific guidelines to plan your migration process:

- Backup the following:
  - Enterprise Control Room v10.x\* SQL database
  - Enterprise Control Room v10.x\* shared repository
  - Enterprise Control Room v10.x\* Subversion database (if applicable)
  - Bot Insight SQL database (if applicable)
  - Bot Insight metadata database (if applicable)
- Ensure that the Automation Anywhere 10.x environment is controlled and monitored after the migration process is initiated as follows:
  - Do not create users, roles, schedules, and permissions.
  - Do not create and upload any metadata.
  - Do not check out bots (if version control is enabled)
  - Schedule and deploy only on-demand bots.

\*includes Automation Anywhere 10 LTS, 10 SP2, and hot fixes with these as the base version.

## After you finish

Prepare the systems hosting the source and destination Enterprise Control Room as a [migration prerequisite](#).

Related concepts

[Prepare for migration](#)

### Prepare for migration

Prepare the environment at the source and destination Enterprise Control Room. This involves ensuring access to applications in the source Enterprise Control Room, installing and setting up the destination Enterprise Control Room, other configuration setting changes in both, and more.

Plan the migration process by reviewing the [considerations](#) before preparing the source and destination Enterprise Control Room.

The required activities in the system hosting the source Enterprise Control Room are as follows:

- Access the Enterprise Control Room v10.x\* repository path through a shared drive. Map the 10.x repository path set to the local drive to a shared path and provide read access to the 11.x administrator.
- Gather and make a record of the following information:
  - Credentials to connect to Enterprise Control Room v10.x\* SQL Server database.
  - Master key to connect to the Credential Vault of Enterprise Control Room v10.x\*.
  - Credentials to connect to the Bot Insight SQL database (applicable only if using bot Insight with Enterprise Control Room v10.x\*).
  - URL of Bot Insight metadata database.

The required activities in the system hosting the destination Enterprise Control Room are as follows:

- Set up a new infrastructure (that is separate from a 10.x\* environment) with Automation Anywhere v11.x.x Enterprise Control Room already installed.
- Install the Enterprise Control Room 11.x.x license.
- Access the migration wizard by logging in to the Enterprise Control Room as an administrator.

The administrator has View and Manage Migration permission.

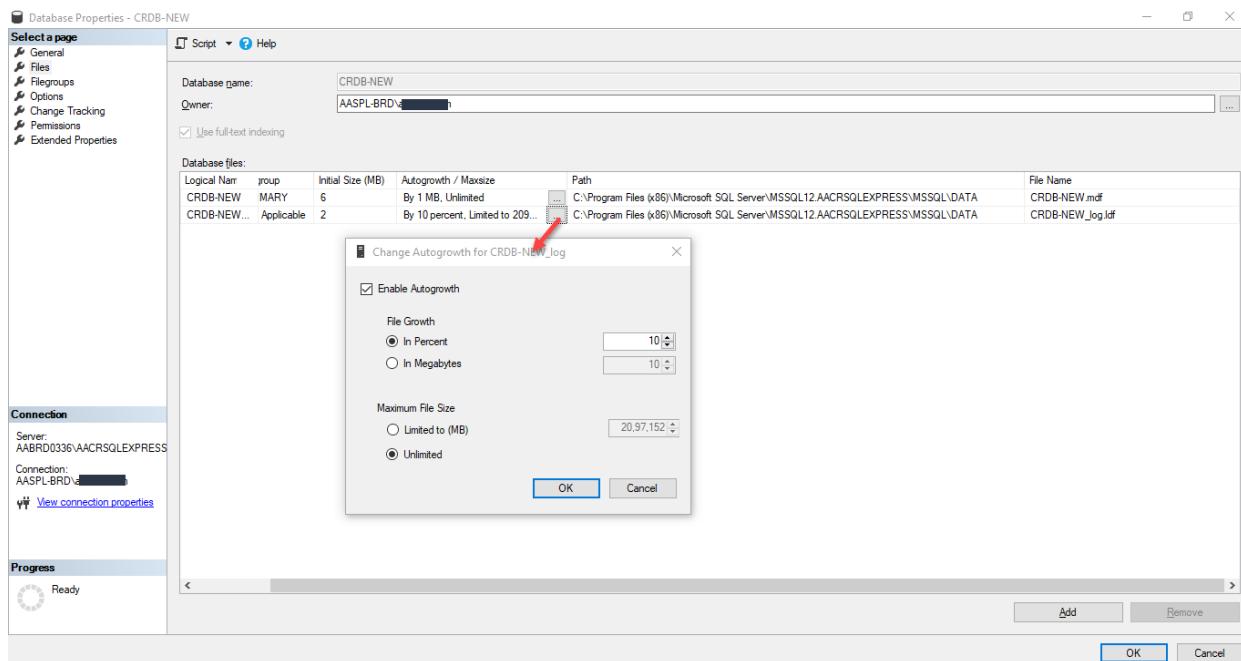
- Configure the Credential Vault.
- Configure version control settings.

If version control is enabled in 10.x Enterprise Control Room, enable the same in the 11.x.x Enterprise Control Room manually because the settings for version control are not migrated. Use a fresh Subversion database for 11.x.x which is different from a 10.x Subversion database. See [Enterprise Control Room settings](#).

- Start the SQL database service if it is not running.
- Provide the user, who has the permission to run the destination Enterprise Control Room Microsoft Windows Services on the source database, access on the source database, if Windows Authentication is used to connect to the source database.
- Import the source Enterprise Control Room certificates to the Java trust store if using a secure connection, as follows:
  1. Run the command prompt in administrator mode.
  2. From the Automation Anywhere installation path, for example, C:\Program Files\Automation Anywhere\Enterprise, type or paste the following command at the prompt:

```
jre\bin\java -jar certmgr.jar -appDir "C:\Program Files\Automation Anywhere\Enterprise" -importTrustCert "<Certificate Path>"
```

- Set the property of log files in the 11.x.x database to Enable Autogrowth to allow for maximum data processing during migration. See the following figure of the Windows UI screen:



\*includes Automation Anywhere 10 LTS, 10 SP2, and hot fixes with these as the base version.

After you finish

[Start the migration process](#) from the destination Enterprise Control Room interface.

---

#### Related tasks

[Start migration wizard](#)

## Start migration wizard

Start the Migration wizard from the Enterprise Control Room interface.

## Prerequisites

After meeting the [prerequisites](#), start the migration process by doing the following steps:

1. Log in to the Enterprise Control Room 11.x.x using your first administrator credentials.
2. Go to Administration > Migration, and click Migrate data or migrate data now.

The Migration wizard appears, containing the following tabs:

- Database: Enables you to configure database parameters
- Settings: Enables you to select the migration type
- Roles/Users/Bots: Enables you to select the entities to migrate
- Data: Enables you to review associated migration data and start the process

Note: The migrate data now link is visible only when the migration process is initiated for the first time.

## Next steps

Next, [connect the source Control Room database](#) from the source Control Room.

#### Related tasks

[Connect to source Control Room database](#)

## Connect to source Control Room database

Provide the source Enterprise Control Room database setting and configuration details.

## Prerequisites

After starting the [Migration wizard](#), connect to the source Enterprise Control Room 10.x database by doing the following steps:

## Procedure

1. In the Database tab of the Migration wizard, keep the Use secure connection selected if the SQL instance hosting the 10.x Enterprise Control Room database is configured with a secure connection. Clear this selection if the source SQL Server is not configured with a secure connection.
2. Provide the Server host name and Server port number of the SQL Server where the Enterprise Control Room 10.x database is hosted.
3. Depending on the configured authentication method for SQL Server, do the following:
  - a) Microsoft Windows: Keep the Use Windows authentication selected if the source SQL Server is configured using Microsoft Windows authentication.
  - b) SQL Server: Clear the selection and provide the Username and Password, if the SQL Server is configured with SQL authentication.
4. Type the source Enterprise Control Room database name.
5. Copy the source Enterprise Control Room master key and paste it in the Master key field.

You can now connect to the Credential Vault of the source Enterprise Control Room. The master key is shown as encrypted after you save the migration process.

6. Type the source Enterprise Control Room Repository path.

This must be a shared path and accessible to the user on the machine doing the migration process in the destination Enterprise Control Room. Share the source Enterprise Control Room repository path up to the Automation Anywhere folder path.

For example, D:\\Data\\Automation Anywhere Server Files.

For a stand-alone source Enterprise Control Room with a repository path set to a local drive, map the 10.x repository path to a shared path and provide read access to the 11.x administrator. However, if it is pointing to a local drive, the settings page of the Enterprise Control Room 10.x requires no changes.

Important: Ensure the 10.x repository path is accessible during migration because bot migration fails if the path is inaccessible.

7. Click Save to skip migrating the Bot Insight database.

For steps to migrate the Bot Insight database, see [Connect to source Bot Insight database](#).

Note: You can change the Database connection settings until the migration process starts. The database tab is disabled when the process starts.

After you click Save, the Enterprise Control Room verifies the data provided in the preceding steps.

- If a connection to the SQL server cannot be established, a message is shown suggesting the following:
  - The secure connection is not set correctly.
  - The server host name, port, or database name is incorrect.
  - The Use Windows authentication option is not selected.
  - The username or password is incorrect.
- If the Master key is invalid, a message instructs you to retry.
- If the Repository path is incorrect, not shared, or inaccessible, a message advises you to verify that the path is correct and mapped to a shared drive with the required permissions.

8. Click Next to select migration of data based on roles, users, or bots.

## Next steps

If installed, provide the source Enterprise Control Room [Bot Insight database setting and configuration details](#) as the next task. Otherwise, select the [type of migration](#).

Related tasks

[Connect to source Bot Insight database](#)

[Select migration type](#)

## Connect to source Bot Insight database

If installed, provide the source Enterprise Control Room Bot Insight database setting and configuration details.

## Prerequisites

The [Connect to source Control Room database](#) task must be completed successfully before you can complete this task.

Connect to the source Bot Insight database by doing the following steps:

## Procedure

1. In the Database tab of the Migration wizard, select Connect to 10.x Bot Insight database.  
All fields for the Bot Insight database connection are enabled.
  2. Select the Use secure connection option if the SQL instance hosting the source Bot Insight database is configured with a secure connection.
  3. Provide the host name and port number of the SQL Server on which the source Bot Insight database is hosted.
  4. Depending on the configured authentication method for SQL Server, do the following:
    - a) Microsoft Windows: Keep the Use Windows authentication selected if the source SQL Server is configured using Microsoft Windows authentication.
    - b) SQL Server: Clear the selection and provide the Username and Password, if the SQL Server is configured with SQL authentication.
  5. Type the source Enterprise Control Room Bot Insight database name.
  6. Type the Server URL where the Bot Insight Visualization Server Port is configured.  
For example: <http://productlt.aae.com:82/analytics>.
  7. Click Save to connect to the database.
- After you click Save, the Enterprise Control Room verifies the data provided in the preceding steps.
- If a connection to the SQL server cannot be established, a message is shown suggesting the following:
    - The secure connection is not set correctly.
    - The server host name, port, or database name is incorrect.
    - The Use Windows authentication option is not selected.
    - The username or password is incorrect.
  - If the Master key is invalid, a message instructs you to retry.
  - If the Repository path is incorrect, not shared, or inaccessible, a message advises you to verify that the path is correct and mapped to a shared drive with the required permissions.
8. Click Next to [select migration of data based on roles, users, or bots](#).

### Related tasks

[Select migration type](#)

## Select migration type

Choose to migrate data from your source Enterprise Control Room based on roles, users, or bots.

## Prerequisites

Complete the [Connect to source Control Room database](#) task before selecting the migration type.

If a migration process is running and you try to change the migration type, a message instructs you to retry after the previous migration completes.

However, if the machine restarts when the migration is in progress, start the migration process although the status is shown as In Progress.

## Procedure

1. In the Settings tab of the Migration wizard, select the migration option:
  - Roles and associated data: In addition to the roles, data associated with those roles, for example, users, licenses, bots, folder access permissions, information about the user who created the bot,

credentials, historical activity, and schedules are also migrated. Use this option. To skip migrating the data associated with the selected roles, select Exclude bots and schedules.

- Users and associated data: In addition to the users, data associated with those users, for example, roles, licenses, bots, credentials, historical activity, and schedules are also migrated. To skip migrating the data associated with the selected users, select Exclude bots and schedules.

If you select this option, the roles that are not associated with any user are not migrated and the schedules that are associated with the users that were not selected for migration are also not migrated.

- Bots and Schedules: In addition to the selected bots dependent data, for example, subtasks, files, historical activity, and schedules are migrated automatically. The roles and/or users are not migrated.

2. If you choose to migrate data based on Bots and Schedules, do the following:

- Select the Exclude MetaBots option to skip migrating the MetaBots and dependent MetaBots of TaskBots.
- Select the Overwrite if bot already exists option, if you have the updated/latest version of bots in the source database and you must overwrite the same bot which was previously migrated to 11.x.
- 11.3.3** Select the Include Historical Activity option to include the task run history of the bots that are selected for migration.

Note: Before you migrate the Historical Activity, you must migrate the associated Users and the Bots and ensure that you log in to the same Device as that of 10.x version to prevent the failure of the historical activity migration.

3. Click Next.

## Next steps

- If the Roles and associated data option is selected, [the Roles page appears](#).
- If the Users and associated data option is selected, [the Users page appears](#).
- If the Bots and schedules option is selected, [the Bots page appears](#).

### Related tasks

[Select bots to migrate](#)

[Select MetaBots to migrate](#)

[Select users to migrate](#)

[Select roles to migrate](#)

## Select roles to migrate

Migrate all or selected roles from the source to the destination Enterprise Control Room. When you select roles, other related data, for example, licenses, users, credentials, historical activity, and schedules are also migrated.

### Prerequisites

This tab is shown only if you [select Roles and associated data](#) in the Settings tab.

Before selecting the roles, review the following considerations:

- Bots and files are migrated based on users having at least one folder permission specifically, Upload, Download, or Delete.
- Migrate all system roles before migrating bots and schedules to ensure that the folder permissions are assigned properly to system roles.
- The system defined roles from source 10.x Enterprise Control Room are mapped automatically to the corresponding destination Enterprise Control Room.
- Similarly, user permissions from source 10.x Enterprise Control Room are mapped to the destination Enterprise Control Room.
- Roles that have any of the Upload, Download, or Delete permissions, are given Run/Schedule permission by default on migration.
- User-defined roles with the same name have \_1 as a suffix to the name.
- Schedules from the source Enterprise Control Room that are already in the destination Enterprise Control Room are migrated with the same name.
- For the next migration run, the Available roles list shows all roles, regardless of whether they are migrated.

## Procedure

1. In the Available roles list, click the checkbox next to Role Name to select all roles.  
Alternatively, select each role from the list.  
Note: The Available roles show all roles (both system and user-defined) that exist in the 10.x Enterprise Control Room database.
2. Add roles to the Selected list.
3. Click Next.

## Next steps

To review and verify data, see the [Verify data and migrate](#) task.

Related tasks

[Verify data and migrate](#)

## Select users to migrate

Migrate all or selected users from the source to the destination Enterprise Control Room. When you select users, other related data, for example license, roles, credentials, bots, historical activity, and schedules are also migrated.

## Prerequisites

This tab is shown only if you [select Users and associated data](#) in Settings tab.

Before selecting the users, review the following considerations:

- Bots and files are migrated based on the user having at least one folder permission, specifically, Upload, Download, or Delete.
- Users with same name have \_1 as a suffix to the name.
- Deleted users are not migrated.
- All dependencies for a user or role are migrated based on the user's folder permissions for the assigned role.

- All user licenses are migrated automatically when you migrate the users. However, license migration is not visible on the Enterprise Control Room user interface.
- System-defined credentials related to Auto-login and Email Settings that are set in Automation Anywhere 10.x Enterprise client by the user are automatically migrated.
- A license migration for the user might fail if the destination Enterprise Control Room does not have sufficient user licenses.
- For Active Directory users, if the domain user with same name already exists in the destination Enterprise Control Room, then these users and their dependencies are skipped during migration.
- For the next migration run, the Available users list shows all users regardless of whether they are migrated.

## Procedure

1. In the Available users list, click the checkbox next to User Name to select all users.  
Alternatively, select each user from the list of users.
2. Add users to the Selected list.
3. Click Next.

## Next steps

To review and verify data, see the [Verify data and migrate](#) task.

Related tasks

[Verify data and migrate](#)

## Select bots to migrate

Migrate all or selected bots from the source to the destination Enterprise Control Room. When you select the bots, schedules associated with the bots are also migrated.

### Prerequisites

This tab is shown only if you [select Bots and schedules](#) in Settings tab.

Before selecting the bots, review the following considerations:

- If the source Enterprise Control Room has Version Control enabled then:
  - The version history of both the bots and bot dependencies is migrated
  - The production version which is last set is migrated. Configure version control in the destination Enterprise Control Room manually because the source 10.x Version Control settings are not migrated.
  - Locked bots and files are unlocked and then migrated to 11.x.
  - Client Last Modified and Modified by fields for each version of the migrated bot is set to the name of the current Enterprise Control Room user running the migration process. The Modified by field of the migrated bot is set to SYSTEM if the user referencing this field is not migrated in 11.x.
  - The date of the folder creation is set to the date of the migration to the destination Enterprise Control Room when a bot is migrated for the first time. The date of the bot file is set to the system date and time when the bot file was uploaded in the source Enterprise Control Room. If version control is set, then the date of the latest version of the bot file is taken. By default, version control is not set.

- Only the selected bots with associated dependencies and schedules are migrated. Migrate roles and users separately.
- When migrating a bot and its schedule, if the user who created the schedule is not migrated to 11.x or deleted in 10.x, then these schedules are not migrated.
- Manual dependencies associated with the bot are also migrated.
- Password-protected bots and the corresponding schedules are not supported in 11.x and they cannot be migrated.
- Schedules that are password-protected are also not migrated.
- Migrating a folder is not possible. To migrate all the files in a folder, select all the files in that folder.
- If a 10.x bot to be migrated already exists in 11.x, then it is not migrated.
- If you select a bot from 10.x that has the same name in 11.x, the bot and the corresponding schedules are not migrated.
- If the Modified by field for bot(s) fails to migrate, the field shows the name as SYSTEM in the My bots and Edit page.
- When the following options are selected, do the following:
  - When Exclude MetaBots is selected, you must migrate those separately. This also means that if MetaBot(s) are part of a TaskBot as dependency they shall NOT be migrated. Also, the My MetaBots folder is not displayed in the Folders list of the repository.
  - When Overwrite if bot already exists is selected, existing bots are overwritten if the bots were migrated from the 10.x Enterprise Control Room in a previous migration run. However, bot(s) with same name that are created or uploaded in 11.2 are not overwritten. The migration of these bots fails.
    - The dependent subtask bots, MetaBots, and files are overwritten but schedules are not overwritten when the system overwrites bots.
    - If version control is enabled in both systems, selecting this option overwrites the version history and new version numbers are allotted to the bots.
- **11.3.3** When Include Historical Activity is selected, the task run history of the selected bots and their dependencies are migrated from the 10.x Enterprise Control Room to the 11.x version on successful migration. If the bots were already migrated in the previous migration run and the history was not, when migrating the data next time, the migration process skips to migrate the bots and migrates the corresponding task run history. The historical activity migration fails because of the following reasons:
  - If you have not migrated the associated User and TaskBot.
  - If you have not used the same Device as that of 10.x for migration.

## Procedure

1. Go to the folder from which you want to migrate the bot(s) in the Folders list.  
The bots corresponding to the selected folder appear in the Available bots list.
2. Click the checkbox next to Type to select all bots from that specific folder.  
Alternatively, select specific TaskBots from the list of bots.  
Browse through all the folders and select bots from the individual folders. If the selected folder has subfolders, those also appear in this list as disabled. To migrate all bots from a subfolder, expand and select the subfolder from the Folders list and select the bots separately.
3. Add the bots to the Selected list.
4. Click Next.

## Next steps

To review and verify data, see the [Verify data and migrate](#) task.

Related tasks

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[Verify data and migrate](#)  
[Select MetaBots to migrate](#)

## Select MetaBots to migrate

MetaBots can be migrated separately by selecting the option Bots and schedules in the Settings tab. The procedure is similar to that of migrating bots.

### Prerequisites

This tab is shown only if you [select Bots and schedules](#) in Settings tab.

Before selecting the MetaBots, review the following considerations:

- MetaBots are migrated based on the user having at least one folder permission, specifically upload, download, delete, or execute.
- A MetaBot is not migrated if it is a dependency of a TaskBot and the option Exclude MetaBots is selected. Migrate dependent MetaBots separately using the steps in this section.
- A MetaBot is migrated regardless of its associated role or user being migrated to the 11.x Enterprise Control Room.
- Duplicate MetaBots are overwritten on migration only when the option Overwrite if bot already exists is selected.
- 'My MetaBots' folder permissions are not propagated when a new folder is migrated in the destination Enterprise Control Room.

### Procedure

1. Go to the My MetaBots folder to migrate the bot(s) in theFolders list.  
The MetaBots corresponding to the selected folder appear in the Available bots list.
2. You have two options:
  - a) Click the checkbox next to MetaBot to select all MetaBots from that specific folder.
  - b) Select specific MetaBot from the list of MetaBots.
3. Add the bots to the Selected list.
4. Click Next.

### Next steps

To review and verify data, see the [Verify data and migrate](#) task.

Related tasks

[Verify data and migrate](#)

### Verify data and migrate

Review and confirm data related to the selected roles, users, and/or bots, with the dependent or associated data, for example MetaBots, schedules, credentials, and so on.

## Prerequisites

Based on your selected options in the [Settings](#) tab, the ROLES, USERS, BOTS, SCHEDULES, and CREDENTIALS tabs are shown.

## Procedure

1. Verify that the selected ROLES are available for migration:  
If the Exclude Bots and Schedules option is selected in the Settings tab, the BOTS and SCHEDULES tabs are not displayed.
2. Verify that the selected Users and the users included based on the selected roles are available for migration.
3. Verify that the selected Bots are available for migration.  
The BOTS tab does not show dependent bots or files that are added to a parent bot. After the migration process completes, the dependent bots and files are shown on the Migration Details page.
4. Verify that the Schedules associated with the bots are available for migration.
5. Verify that the system Credentials associated with the users are available for migration.
6. Click Migrate data and confirm when prompted.

## Next steps

After the migration process completes, the status of each entity (roles, users, bots, schedules, history, and credentials) appears in separate tabs. You can export details of the migration to a CSV file for record keeping and compliance.

[Analyze the migration status](#) to decide if the migration process must be rerun.

Related reference

[Analyze migration status](#)

### Analyze migration status

Analyze the results after the migration process completes to track missing or incomplete data and decide if the migration process must be rerun.

### Before you begin

Ensure the [migration process](#) is successfully completed before you analyze the results.

During the first migration run, the entities related to Enterprise Control Room settings, for example, the mail server configuration, email notification, and client configuration are migrated automatically.

The Migration Details page shows the status and the corresponding reasons for the status of each entity (roles, users, bots, schedules, history, and credentials) selected for migration. The status of an entity is Success, Skipped, or Failed.

- Analyzing the Success details helps to understand how the data was successfully migrated. For example, if a user or role already exists in v11.x.x, then, migration of that user or role shows a Success status. However, the migrated user or role is renamed with the suffix \_1. The existing entity is not modified in v11.x.x.

- Analyzing the Skipped details helps to understand if the entity must be included in the next migration run. For example, if you select a bot from 10.x that has the same name in 11.x.x, the bot and the corresponding schedules are skipped. Make the required changes to include it in the next migration run.
- Analyzing the Failed details helps to understand the configuration changes required to ensure that the entity is migrated in the next run. For example, password-protected bots and schedules are not supported in 11.3.x and they cannot be migrated.

## After you finish

You can now [complete the post-migration activities](#).

### Related tasks

[Complete post-migration activities](#)

## Complete post-migration activities

After all intended entities are migrated, do the post-migration tasks before using the v11.x.x Enterprise Control Room.

## Prerequisites

To analyze the migration status, see the [Analyze migration status](#) task.

- By default, all migrated schedules are disabled. To activate schedules post-migration, manually add the devices to the migrated schedules.
- To bookmark the Dashboards for quick access and retrieval, re-create them.

## Procedure

1. Do the following to on-board the migrated schedules:
  - a) Install the Automation Anywhere Enterprise client v11.x.
  - b) Register the Enterprise client devices with the migrated user.  
See [Bot creators and bot runners - an overview](#) .
  - c) Edit the schedules to add the required devices.
  - d) Enable the schedule.  
See [Schedule a bot](#) for the last two steps.
2. Remove dependencies manually from the bot.  
Manual dependencies of a schedule in 10.x are automatically migrated. Because these are static, an updated bot (new version) does not update the dependent files. The manual dependencies cannot be deleted from the bot repository. Remove them manually from the bot. Manual dependencies also do not get downloaded from the Enterprise Control Room when a bot with dependencies is downloaded.
3. Do the following to add a schedule's manual dependencies created in the source Enterprise Control Room that has version control configured:
  - a) Download the required file or files, that is, do a rollback from version history.
  - b) Manually add the reference dependencies.
  - c) Save the task.
  - d) Set the production version to run the task.
4. Migrate the dashboard bookmarks.  
See [Bookmark dashboards](#).

## Migration: FAQs

Find answers to questions on specific scenarios related to migration.

1. Are the schedules created by a user existing in the destination Enterprise Control Room or deleted from source Enterprise Control Room migrated?

No, these schedules are not migrated.

- If an [Active Directory](#) user who created a schedule in the source, exists in the destination, then the first run of the migration shows the status for Schedules as Failed because of the following reason:  
**Unable to continue as the user with same name already exists**
- If a non-[Active Directory](#) user who created a schedule in the source does not exist or is deleted in the destination, then the first run of the migration shows the status for Schedules as Failed because of the following reason:

**User <username> for this schedule does not exist**

For more information on migrating users, see [Select users to migrate](#).

2. IQ Bots and My Lists are deprecated from 11.2. What happens to the bots that have IQ Bots as dependent files or the files that are present in My Lists?

IQ Bot dependency and My Lists are filtered out because they are deprecated in 11.2. These are not listed in the preview.

For more information on migrating bots, see [Select bots to migrate](#).

3. I am currently on Enterprise Control Room LTS and I want to migrate to Enterprise Control Room 11.2. What happens to the Repository Path field value?

The Repository Path remains the same and this field is disabled after migrating to 11.2.

For more information on providing the source Repository Path details, see [Connect to source Control Room database](#).

4. I have migrated from Automation Anywhere 11.2 or earlier 11.x version to Automation Anywhere 11.3. What are the precautionary steps to recover schedules, which had disappeared in version 11.2 or earlier 11.x versions?

Once you upgrade to version 11.3, for schedules that already exist and are visible in the Schedules page, we recommend that you first deactivate and then reactivate those schedules so that they do not go missing in the first week from the Schedules page.

Refer issue 96586, 97793, 101607 in the [Fixed Features](#) section.

Important: (This note applies to the 11.x version before Version 11.3.2). You can deactivate and then activate only those schedules that were initiated on different weekdays than the present day. For example if a weekly schedule is set to run on Monday and the initial execution of the schedule is also Monday at 13:00 hrs, then first deactivate/activate it on any day other than Monday. You can deactivate/activate on Monday only after it runs at 13:00 hrs. See table for reference:

Schedule name	Schedule date, day, and time	Action
Schedule-1	01/07/19, Monday, 13:00 hrs	Do not deactivate and reactivate. Perform this action only after the schedule runs.
Schedule-2	01/08/19, Tuesday, 13:00 hrs	Deactivate and then reactivate
Schedule-3	01/09/19, Wednesday, 13:00 hrs	Deactivate and then reactivate

For details on how to recover the schedules, see topic [Recover schedules post upgrade](#) after upgrading to Automation Anywhere Enterprise 11.3.

Customers upgrading from Automation Anywhere 11.2.1 need not perform the recovery steps given in the topic as the issue was fixed in that version.

#### 5. What are the specific considerations for migrating from 10.x to Version 11.3.x.x?

Enterprise Control Room provides a built-in migration tool that allows existing customers to migrate their data from earlier versions of Automation Anywhere viz. 10 SP2, 10 LTS to Version 11.3.x.x. For versions before 10 LTS (10.3), customers will have to undergo a two-step migration process – first upgrading to 10 LTS and then to Version 11.3.1.

**Attention:** Data can be migrated only from one SQL database instance to another SQL database instance for Enterprise Control Room DB and from PostgreSQL instance to another PostgreSQL instance for Bot Insight DB.

Migration from Microsoft SQL Server to Oracle Server for Enterprise Control Room DB and PostgreSQL Server to Microsoft SQL Server for Bot Insight DB is not supported in the current version.

#### 6. **11.3.3** What are the specific considerations for migrating the Historical Activity from version 10.x to version 11.x?

- You must migrate the corresponding Users and Bots from version 10.x. See [Select bots to migrate](#).
- You must log in with the same migrated user, using the same Device or Client with the same Fully Qualified Domain Name (FQDN) as that of 10.x.

For example: If John was logged in MY-DEVICE-NAME.COM device in 10.x, the same user in 11.x, John must be logged in to the same MY-DEVICE-NAME.COM device.

#### 7. **11.3.3** Is it possible to migrate the Historical Activity using API?

Yes, migration of historical activity is supported by API and UI both.

#### 8. **11.3.3** My machine is affected by virus and is destroyed. Will I be able to migrate the Historical Activity?

No, you cannot migrate the Historical Activity. You require the same machine to migrate the Historical Activity. The migration process can also fail if the same device is unavailable due to the following reasons:

- If the virtual machine is destroyed.

- If the same machine is used but the host name is changed.

## Bots - Overview

As a Enterprise Control Room user with administrator or My Bots privileges, you can use the bots module of Enterprise Control Room to do the following.

2019.02 Beta Test v2019.02 content.

- Run and schedule uploaded bots
- Run bot with queue
- Export bot files for Business Life-cycle Management
- Import bot files for Business Life-cycle Management
- Work with secure and centralized credentials

Note: To perform these actions, you must be an administrator or have the following roles and privileges.

- View my bots
- Run my bots
- Export bots
- Import bots

Note: You can not schedule or run Attended Bot Runners from the Enterprise Control Room. Only Unattended Bot Runners are available for Run operation.

- [Credentials - Overview](#)  
Passwords and other sensitive information such as user credentials, account number, and social security numbers included in automation tasks, are encrypted and stored as credentials centrally in the Credential Vault.
- [My bots - overview](#)  
As a Bot Creator, when you upload files from Enterprise client, the files are displayed on the My bots page.

## Credentials - Overview

Passwords and other sensitive information such as user credentials, account number, and social security numbers included in automation tasks, are encrypted and stored as credentials centrally in the Credential Vault.

All Enterprise Control Room users can create credentials.

## Benefits of creating credentials

Apart from providing a secure and centralized location for storing credentials, it:

- Minimizes the possibility of credential fraud.
- Provides an environment to enable improved security.
- Enables businesses to adhere to processes and credential management compliance.

- Offers increased automation opportunities with secure data/ applications.

## Roles permission for credential and locker management

The screenshot shows the 'Create role' interface. Under the 'BOTs' section, there is a group of checkboxes. One specific checkbox, 'Manage my credentials and lockers', is checked and highlighted with a red dashed border around its row. Other checkboxes in this group include 'Manage my lockers' and 'Administer ALL lockers'. There are also other groups of checkboxes for 'Delete my scheduled activity', 'View and manage ALL scheduled activity', and 'View my bots', 'Run my bots', 'Export bots', and 'Import bots'.

**Manage my credentials and lockers:** By default, you (all users) can see the Credentials tab and manage your own credentials. In addition, you can interact with locker of other users, if they provide locker access permission. For more information on lockers, see [Lockers - Overview](#).

## My Credentials

This tab consists the list of credentials created by a user. All users have permission to see their credentials.

In case you have AAE\_Locker Admin permission, then you can view credentials of all the users. In the search pane you can filter credentials according to the credential name.

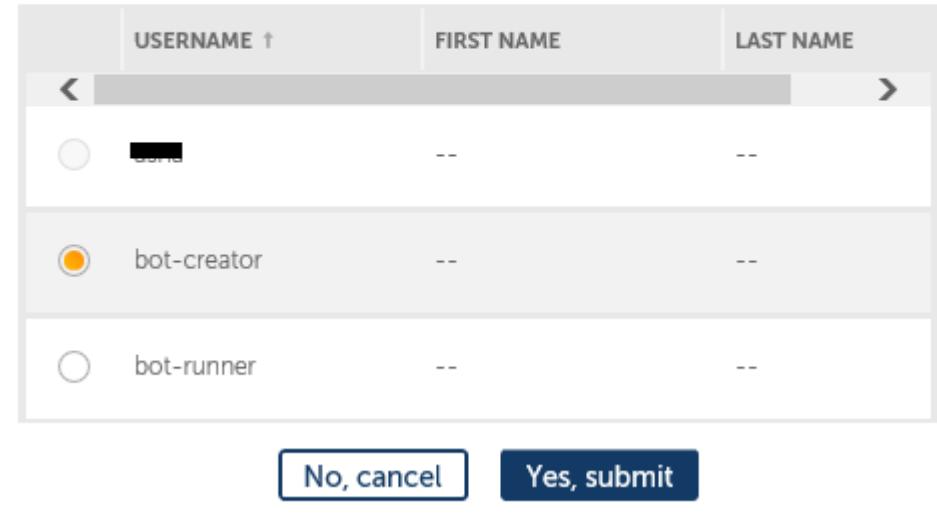
The following describes the list of items that can be viewed in the table:

Table Item	Description
Type	Shows the type of credential as user-provided or standard.
Name	Name of the credential.
Locker Name	Name of the assigned locker for the credential.
My Access	Credential owner: Credential has been created by you. Credential non-owner: Credential has been created by other user.
Request Status	All values provided: Value has been given.

Table Item	Description
	Requests sent: Request has been sent to users to input credential value.
Credential Owner	Name of the user who has created the credential.
Last Modified	Date and time when the credential was last edited.
Modified By	Name of the user who has modified/edited the credential.

The following describes the list of actions that can be done on individual entries in the table:

Actions	Description
 View	Allows you to view credential details. <a href="#">Learn more</a>
 Edit	Allows you to edit a credential. <a href="#">Learn more</a>
 Delete	<p>Allows you to delete a credential. <a href="#">Learn more</a></p> <p>To delete a credential, user must be a credential owner</p> <p>To delete a credential, click Accept.</p>
 Transfer Credential Ownership	<p>Allows you to transfer the ownership of the credential. If locker is assigned to your credential then the ownership can be transferred to any member of the locker. Else it can be transferred to any user in the system.</p> <p>After the ownership is transferred to another user, the previous owner can no longer access the credentials. Also, only a Locker Admin has permission to transfer credential ownership.</p> <p>Select the user and click Submit.</p>

Actions	Description												
	<p><b>Transfer ownership of credential</b> Which user do you want to transfer the credential "FTP" to?</p>  <table border="1"> <thead> <tr> <th>USERNAME ↑</th> <th>FIRST NAME</th> <th>LAST NAME</th> </tr> </thead> <tbody> <tr> <td><input type="radio"/> [REDACTED]</td> <td>--</td> <td>--</td> </tr> <tr> <td><input checked="" type="radio"/> bot-creator</td> <td>--</td> <td>--</td> </tr> <tr> <td><input type="radio"/> bot-runner</td> <td>--</td> <td>--</td> </tr> </tbody> </table> <p><b>No, cancel</b>    <b>Yes, submit</b></p>	USERNAME ↑	FIRST NAME	LAST NAME	<input type="radio"/> [REDACTED]	--	--	<input checked="" type="radio"/> bot-creator	--	--	<input type="radio"/> bot-runner	--	--
USERNAME ↑	FIRST NAME	LAST NAME											
<input type="radio"/> [REDACTED]	--	--											
<input checked="" type="radio"/> bot-creator	--	--											
<input type="radio"/> bot-runner	--	--											

Alternatively, you can select all credentials and perform the following table-level actions:

Table Item	Description
 Refresh	Allows you to refresh the list of credentials.
 Delete	Allows you to delete multiple credentials.
 Customize columns	Allows you to show or hide specific columns. By default, all the columns are displayed.

## Audit Logs

Create, Update, Delete, and Transfer Credential Ownership actions are tracked in audit logs for record keeping and future use. You can refer those entries in the Audit log page.

- [Create a credential](#)

As an automation expert, Credential Vault provisions you to securely create and store your credentials. Therefore, it ensures that your credentials can be used in bots without compromising security with safe deployment of tasks. Any authorized user can create credentials.

- [View a credential](#)

As an authorized user, you can view details such as the credential details, attribute name, description, credential type and value, and general details of any credential.

- [Edit a credential](#)

As a Enterprise Control Room user, you can edit details of a credential. This is useful in scenarios where you may want to make changes to your credential definition and value.

- [Delete a credential](#)

A credential owner can select the delete option to remove redundant credentials from the system. If you are not a credential owner, then you cannot delete a credential.

- [Lockers - Overview](#)

A locker is used to group related sensitive information, that is included in automation tasks in the form of credentials, and share it with other users.

- [Set up a locker and assign relevant credentials](#)

A locker is used to group related sensitive information and can be shared with other users. A locker can be included in automation tasks in the form of credentials. You set up a locker and assign the necessary credentials to allow your bots secure access to relevant systems.

- [Create a locker](#)

A user with locker admin or manage my locker permission is authorized to create a locker. A locker can be used to group similar credentials and share it with other users.

- [View a locker](#)

Any user with "Manage my lockers" permission can view their own lockers. This provides information such as credentials assigned to the locker, locker owners, locker managers, locker consumers, and locker participants.

- [Edit a locker](#)

Enterprise Control Room users with AAE\_Locker Admin role or any user having edit permission can edit their own lockers and access this feature.

- [Delete a locker](#)

To eliminate redundant lockers from the system, a locker owner can perform the delete action.

- [Credential requests](#)

A Enterprise Control Room user can send credential requests to locker consumers. That means, when a user-provided credential is added to a locker, all locker consumers receive a credential request to fill in their credential values.

- [Credential Vault email notifications](#)

In Enterprise Control Room, if the email notification setting is enabled, it ensures that users are notified if any important changes about credentials and lockers are made.

#### Related tasks

[Create a credential](#)

[View a credential](#)

[Edit a credential](#)

[Delete a credential](#)

## Create a credential

As an automation expert, Credential Vault provisions you to securely create and store your credentials. Therefore, it ensures that your credentials can be used in bots without compromising security with safe deployment of tasks. Any authorized user can create credentials.

To create credential, follow the steps mentioned below:

## Procedure

1. Login to Enterprise Control Room, click Bots > Credentials.
2. Click the Create credential button or click create a credential under the credentials tab (This option is displayed only when you are creating your first credential.)

This opens the Create credentials page in which you can add maximum 50 attributes to your credentials. When you create the 50th attribute, the page updates to show the message: "Credentials can only have a maximum of 50 attributes".

3. Provide Credential details such as Credential name and Description (optional).

4. Enter the following Attribute details:

- Attribute name
- Description (optional)
- Value:
  - Standard: The credential owner must enter the value. All consumers see the same credential value set by the credential owner.
  - User-provided: The value field is grayed out as the values are to be provided by the consumer and not preset during creation. Only consumers of the locker containing this credential can provide the value.

You can choose the following security related options to be applicable on the value you input:

- Masked: To hide the value that you type behind special characters (bullets) so that the actual value of the attribute is not visible.
- **11.3.2** This is a password: To mark a particular attribute as password type.

An attribute with this option selected will only be available in those credential variables supported commands in Automation Anywhere Enterprise client where the fields are of Password type.

This ensures the attribute is not exposed and its value cannot be printed in a notepad or any other 'plain text' application.

For commands supporting fields that are of Password type, see [Credential variables](#).

5. Click Create credential.

If you already have an existing locker, then you can assign your credential to the respective one while adding Credential details. If no locker has been created then you must create a locker and then assign your credential.

A notification is displayed when your credential has been successfully created. After your credential is successfully created, it is visible in the list of credentials tab.

If email notification setting is enabled and credentials are added to a locker, then all the locker consumers shall receive an email.

#### Related tasks

[Create a locker](#)

## View a credential

As an authorized user, you can view details such as the credential details, attribute name, description, credential type and value, and general details of any credential.

## Prerequisites

To view a credential, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials.
2. In My Credentials tab, choose the credential. Go to action list and click View credential. View credential page is displayed with the following details:

The screenshot shows the 'FTP' credential details page. At the top right are buttons for 'Edit', 'Delete', and '< Back'. The page is divided into two main sections: 'CREDENTIAL DETAILS' and 'GENERAL DETAILS'.

**CREDENTIAL DETAILS**

Description	Locker	My access	Credential owner
N/A	--	Credential owner	[REDACTED]

**ATTRIBUTE NAME**      **DESCRIPTION**      **TYPE**      **VALUE**

FTP credential	--	User-provided	--
----------------	----	---------------	----

**GENERAL DETAILS**

Last modified	Modified by	Object type	Credential type
18:08:09 IST 2018-12-10	[REDACTED]	Credential	User-provided

- [Edit credential](#)- Allows you to modify the your credential.
- [Delete credential](#) - Allows you to delete your credential.
- Credential details- Description and credential owner.
- Attribute name, credential description, type, value
- General details- last modified (date and time), modified by, object type, credential type

## Edit a credential

As a Enterprise Control Room user, you can edit details of a credential. This is useful in scenarios where you may want to make changes to your credential definition and value.

If a credential type is user-provided, then locker consumers have permission to edit the credential and their credential value.

## Procedure

1. Go to Bots > Credentials
2. Select the credential and click Edit credential.  
If your credential is assigned to a locker, then you can only edit the value of common attribute. And if the attribute is user-provided, then the locker consumers can edit the value.
3. In the Edit credentials page, and make the required changes.

If email notification setting is enabled and credentials are added to a locker, then all the locker consumers shall receive an email. [Learn more](#)

- A credential can be edited by a credential owner, or if the credential type is user-provided then locker consumers can edit the credential value.
- In case of user-provided credential, you can only edit General information such as adding or removing a locker.

- In case of standard credential, you can edit General information such as adding or removing a locker and Attribute detail such as the credential value.
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. Hence, if you have upgraded to the current version from 11.1.2 or less, and have migrated credentials that have more than 50 attributes, while editing that particular credential, you are shown the following message: "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.

## Delete a credential

A credential owner can select the delete option to remove redundant credentials from the system. If you are not a credential owner, then you cannot delete a credential.

## Prerequisites

To delete a credential, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials
2. In My credentials tab, choose the credential. Mouse over to actions list and click delete . If a locker is assigned to a credential, then it cannot be deleted.
3. Click Yes, delete to delete your credential and No, cancel to cancel deletion.
4. To delete multiple credentials, you must perform table level delete action. Select the multiple credentials and click delete .

## Lockers - Overview

A locker is used to group related sensitive information, that is included in automation tasks in the form of credentials, and share it with other users.

This enables separation of duties for credential management and consumption. Users with the following permissions can work with lockers:

- Manage my lockers: This permission allows you to create and manage your own locker.
- Administer ALL lockers: This permission allows you to view all the lockers and perform limited actions on them. This permission is available for AAE\_Locker Admin role only

The roles and permissions related to locker management are:

- Locker Owner: A locker owner can edit, view, delete a locker and can add or remove other owners.
- Locker Manager: A locker manager has access to all the functionality like a locker owner, but does not have permission to add owners, managers, or participants to the locker.

- **Locker Participants:** A locker participant has access to view a locker and participants and can also add own credentials to a locker. A locker participant does not have access or visibility of credentials created by other users.
- **Locker Consumers:** You must select one or more user-defined roles and the users belonging to these selected roles are the consumers of the locker. These users have access to view a locker and input credential value.

## My Lockers

My Lockers tab in Bots – Credentials shows the list of lockers that has been created by a user. A locker can only be created by an authorized user with Locker\_Admin permission or a user having Manage my locker permission.

Note: Users can see lockers only if they have created them or if they are a member of that locker.

Name	I:	MY CONSUMER PERMISSIONS	MY ADDITIONAL PERMISSIONS	MANAGERS	OWNERS	CREDENTIALS
<input type="checkbox"/> FinAdmin locker	Not a consumer	Locker owner	--		ellie.brown and 1 more	0
<input type="checkbox"/> FinHR Locker	Not a consumer	Locker owner	--		amy.chen and 1 more	2
<input type="checkbox"/> FinOps Locker	Not a consumer	Locker owner	--		John.Smith and 1 more	2

In the search pane you can filter lockers based on locker name.

The following describes the list of items that can be viewed in the table:

Table Item	Description
Name	Name of the locker.
My consumer permission	Consumer or not a consumer.
My additional permission	Locker participant, Locker manager, Locker owner.
Managers	Users having locker manager permission.
Credentials	No. of credentials assigned to a locker.
Owners	Name of user who created the locker.
Last Modified	Date and time when the locker was last edited/modified.
Modified By	Name of the user who has modified/edited the locker.

Actions	Description
View	Enables you to view locker. <a href="#">Learn more</a>
Edit	Enables you to edit a locker. <a href="#">Learn more</a>
Delete	Enables you to delete a locker. <a href="#">Learn more</a>

Alternatively, you can select all lockers and perform the following actions:

Table Item	Description
 Refresh	Enables you to refresh the list of lockers.
 Delete	Enables you to delete multiple lockers. <a href="#">Learn more</a>
 Customize columns	Enables you to show or hide specific columns. By default, all the columns are displayed.

## Audit Logs

All the Create, Update, Delete actions are tracked in audit logs for record keeping and future use. You can refer those entries in the Audit log page.

Related tasks

- [Create a locker](#)
- [View a locker](#)
- [Edit a locker](#)
- [Delete a locker](#)

## Set up a locker and assign relevant credentials

A locker is used to group related sensitive information and can be shared with other users. A locker can be included in automation tasks in the form of credentials. You set up a locker and assign the necessary credentials to allow your bots secure access to relevant systems.

Do the following to set up your locker and assign the credentials:

### Step 1: [Create a Role](#)

You can define a role and assign permissions to access various features of the Enterprise Control Room. Only an admin or Enterprise Control Room user with roles permission can assign roles to users and provide access to them for various features and operations.

### Step 2: [Create a credential](#)

Login to Enterprise Control Room as a locker administrator and create a credential. As an automation expert, Credential Vault provisions you to securely create and store your credentials. Therefore, it ensures that your credentials can be used in bots without compromising security with safe deployment of tasks. Any authorized user can create credentials.

### Step 3: [Create a locker](#)

As part of the locker creation procedure, assign the newly created credential and role to the locker. A user with locker admin or manage my locker permission is authorized to create a locker. A locker can be used to group similar credentials and share it with other users.

Related reference

- [Default licenses and roles for bot tasks](#)

## Create a locker

A user with locker admin or manage my locker permission is authorized to create a locker. A locker can be used to group similar credentials and share it with other users.

## Prerequisites

You must have created one or more user-defined roles so that you can assign Locker consumers. To create a locker, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials
2. In My Lockers tab, click Create locker.  
The Create locker page is displayed.
3. Enter locker name and locker description.
4. Enter Credentials.  
Shows the available credentials owned by the user. You can select one or multiple credentials from the list and add it to the locker.  
If email notification setting is enabled and credentials are added to a locker, then all the locker consumers shall receive an email. [Learn more](#)
5. Add Owners.  
A locker owner can edit, view, delete a locker and can add or remove other owners. Also, an owner can be a locker consumer but cannot be a manager or participant within the same locker.
6. Enter Managers.  
A locker manager has access to all the functionality like a locker owner, but they do not have permission to add owners, managers, or participants to the locker. Disabled users cannot be selected as locker managers if they were already selected as owners in the previous tab.
7. Add Participants.  
A locker participant has access to view a locker and participants can also add their own credentials to a locker. A locker participant does not have access or visibility of credentials created by other users.
8. Add Consumers.  
You must select one or more roles. The users belonging to these selected roles are the consumers of the lockers. These users have access to view a locker and input credential value.  
System-created roles are not displayed in the consumer list.  
If the credential type is:
  - Standard: Locker consumers can view the locker and all the credentials inside the locker. They are able to utilize credentials in the locker when running a bot. 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 (i.e. credential value). Consist of same usability as Standard credential.
9. Click Create locker.  
If email notification setting is enabled, all locker consumers receive an email to edit the credential value if the credential type is user-provided.

Related tasks

[Email settings](#)

Related reference

[Credential Vault email notifications](#)

## View a locker

Any user with "Manage my lockers" permission can view their own lockers. This provides information such as credentials assigned to the locker, locker owners, locker managers, locker consumers, and locker participants.

## Prerequisites

To view a locker, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials
  2. In My Lockers tab, choose the locker. Go to action list and click View locker.
- View locker page displays the following details:
- Edit locker- Allows you to modify your locker.
  - Delete locker- Allows you to delete your locker.
  - Credentials- Shows list of credentials added to the locker.
  - Owners- Shows list of locker owners.
  - Managers- Shows list of locker managers.
  - Participants- Shows the list of locker participants. Locker participants can view this locker. They can add their own credentials to a locker. They can view their credentials, but not other credentials in the locker.
  - Consumers- Shows the list of locker consumers. Locker consumers can view this locker and all the credentials inside the locker. A locker consumer with user-provided credential type have two additional permissions:
    - a) They will be able to input their information in user-provided credentials with user-provided attributes.
    - b) They will be able to use credentials in this locker when running a bot.

### Related tasks

[Edit a locker](#)

## Edit a locker

Enterprise Control Room users with AAE\_Locker Admin role or any user having edit permission can edit their own lockers and access this feature.

## Prerequisites

To edit a locker, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials
  2. In My Lockers tab, select the locker to edit. Then on the action list, click edit locker.
- Only a locker owner or locker admin has permission to edit a locker. You can make changes to the following:
- Credentials- Add or remove credentials that are assigned to a locker.

- Owners- Add or remove locker owners.
- 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 shall receive an email.

3. Click Save changes after you finish editing the locker.

Related reference

[Credential Vault email notifications](#)

## Delete a locker

To eliminate redundant lockers from the system, a locker owner can perform the delete action.

## Procedure

1. Go to Bots > Credentials
2. In My Lockers tab, choose the locker. Mouse over to actions list and click delete .
3. Click Yes, delete to delete your locker and No, cancel to cancel deletion.

## Credential requests

A Enterprise Control Room user can send credential requests to locker consumers. That means, when a user-provided credential is added to a locker, all locker consumers receive a credential request to fill in their credential values.

## Prerequisites

To generate credential request, follow the steps mentioned below:

## Procedure

1. Go to Bots > Credentials.
2. Create a credential with credential type as user-provided.
3. Assign your credential to a locker.
4. After all the consumers input the credential value, the status of the credential changes to complete.  
If email notification setting is enabled and credentials are added to a locker, then all the locker consumers shall receive an email to input the credential value.

Related tasks

[Create a credential](#)

Related reference

[Credential Vault email notifications](#)

## Credential Vault email notifications

In Enterprise Control Room, if the email notification setting is enabled, it ensures that users are notified if any important changes about credentials and lockers are made.

Email notifications are sent for each scenario:

- Credential is added to a locker

When a new 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 must 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 or 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, and 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.

## My bots - overview

As a Bot Creator, when you upload files from Enterprise client, the files are displayed on the My bots page.

This page is divided into the following areas.

- [Folders](#)
- [Files and folders](#)

Note: As a Enterprise Control Room user, you must have the right privileges to access this page. Folders for which you do not have access to will not be visible to you.

The My bots page also allows you to perform tasks, such as exploring your documents, executable files, MetaBots, reports, scripts, tasks, and workflows from the Folders area. It also allows you to:

- Import bot files
- Export bot files
- Run a Bot
- Schedule a bot
- Run bot with queue

Bots > My bots

## My bots

To see files here, upload them from your Bot creator or your Bot runner. You will only see files that you have permission to see.  
You can run locked files. A lock icon means that the file cannot be checked out from the client.

Folders		Search name					
		Files and folders (10 of 10)					
		Type	Name	Size	Client Last Modified	Last Modif...	Modified By
<input type="checkbox"/>		Task Bot	Analytics_ATM Reconciliation.at...	13.83 KB	13:00:56 IST 2018-03-05	15:15:52 IST 2018-03-26	mike.lee
<input type="checkbox"/>		Task Bot	Analytics_MortgageProcessing.a...	15.71 KB	18:45:14 IST 2018-02-05	15:15:51 IST 2018-03-26	mike.lee
<input type="checkbox"/>		Task Bot	Analytics_TelecomOrderEntry.at...	16.27 KB	18:45:14 IST 2018-02-05	15:15:49 IST 2018-03-26	mike.lee
<input type="checkbox"/>		Task Bot	Download_File.atmx	87.41 KB	18:49:56 IST 2018-03-06	15:15:47 IST 2018-03-26	mike.lee
<input type="checkbox"/>		Task Bot	Files-Folders.atmx	1.27 MB	15:08:59 IST 2018-03-26	15:15:41 IST 2018-03-26	mike.lee

You can apply search parameters to the Name column.

- You can specify the search parameters in the search bar for Name:

Search name

Files and folders (1 of 1)						
	Type	Name	Size	Client Las...	Last Modif...	Modified By
<input type="checkbox"/>		19-21Sep	N/A	N/A	15:37:46 IST 2018-12-12	bot-creator

- [Files and folder\(s\)](#)

When you click a folder from the Folders area in the My bots page, the contents of the folder are displayed in the Files and Folders area.

- [Create and Edit Folders](#)

As a Enterprise Control Room user with View my bots and Create Folder privileges, you can create folders in the Enterprise Control Room repository.

- [View Bot Details](#)

View bot page provides information, such as the name and other details of the bot. Besides this, you can either run the bot or schedule when to run the bot.

- [View Folder Details](#)

You can use the View folder page to view the details of the folder and search for items within the folder.

- [Folders Area](#)

The folders area allows you to explore and browse your documents, executable files, MetaBots, Reports, Scripts, tasks, and workflows.

- [Run a Bot](#)

The bots must be checked into a Control Room repository so that they are available for production deployment. Users with Run my Bots privileges may then deploy and execute the bots from the In progress, Scheduled, or My Bots page.

- [Delete bot\(s\) and folder\(s\)](#)

As a Enterprise Control Room admin or user with Delete Bot privileges, you can delete one or more bots and Folders that are uploaded by a Bot Creator from the Enterprise client. This option is not available when version control is enabled.

- [Force unlock bots](#)

As a Enterprise Control Room user with Unlock Bot privileges, you can forcefully unlock one or more Bots that are checked out by a Bot Creator in the Enterprise client. This option is available only when version control is enabled.

- [Bot Lifecycle Management \(BLM\) - an overview](#)

As a Enterprise Control Room user with Export and/or Import Bots module permission, you can move your bots (new or updated) from one environment to another using Bot Lifecycle Management (BLM) module in Enterprise Control Room. For example, you can move the Bots that are verified as production ready from staging to production.

- [Export bots](#)

As a Enterprise Control Room user with BLM Export module permission and download privileges for Tasks, Docs, Workflows, and Reports and execute permission for MetaBots, you can export bots and dependent files in different automation environments to help manage your organization's Bot Lifecycle Management (BLM).

- [Import bots](#)

As a Enterprise Control Room user with BLM Import module permission, and Upload privileges for Tasks, MetaBots, Docs, Workflows, and Reports, you can import bots and dependent files that were exported by another Enterprise Control Room user in different automation environments to help manage your organization's Bot Lifecycle Management (BLM).

## Files and folder(s)

When you click a folder from the Folders area in the My bots page, the contents of the folder are displayed in the Files and Folders area.

When Version Control is enabled, the version related columns are displayed. If production version is set for a file, the information displayed in the rest of the columns, such as size is for that version.

The columns of the Files and folders table are described in the following table.

Item	Description
Type	The type of file - Folder or TaskBot. This is based on the type of the file in the folder.
Name	The name of the folder or file.
Size	The size of the file.
Client last modified	<ul style="list-style-type: none"> <li>The date on which the file was last modified on the Bot Creator machine before it was uploaded to the Enterprise Control Room.</li> </ul>

	<ul style="list-style-type: none"> <li>If version control is enabled and the Production Version is set, the date is the one when that particular production version was last modified before it was uploaded to the Enterprise Control Room.</li> </ul>
Last Modified	The date and time when the file was last updated.
Modified by	Name of the user who last modified the file or folder

You can perform the following actions on a column to help you work efficiently.

- 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.
- 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 re-size.

You can perform the following tasks on an individual file or folder in the Files and folders area.

Action	Description
 Run	Allows you to <a href="#">Run</a> the selected Bot.
 Unlock bot	Allows you to <a href="#">forcefully unlock</a> the selected bot if locked for editing by the Bot Creator in Enterprise Client.
 Schedule	<a href="#">Schedule</a> the bot to run.
 Edit folder	Allows you to <a href="#">rename</a> a folder.
 View	Allows you to view details of the file or <a href="#">folder</a> .
 Delete Folder / bot	Allows you to <a href="#">delete a bot, file or folder</a> . Note: This option is not available when Version Control is enabled.
Note: Only Edit, View and Delete options are available for folders.	

Alternatively, you can select all Bots or Folders and perform the following actions. Note that these actions can be performed only at a table level and not on individual items.

Table Item	Description
 Create folder	Allows you to <a href="#">create a folder</a> from the Files and folders section.
 Customize columns	Allows you to customize columns such as show or hide specific columns. By default, all columns are displayed:

	<p><b>Customize columns</b></p> <p><b>ROW-LEVEL TOOLBAR</b></p> <p><input type="radio"/> Hide</p> <p><input checked="" type="radio"/> Show on right</p> <p><input type="radio"/> Show on left</p> <p><b>Show/hide columns</b></p> <p><b>SHOWN COLUMNS (8 OF 8)</b></p> <ul style="list-style-type: none"> <li><input type="radio"/> TYPE</li> <li><input type="radio"/> NAME</li> <li><input type="radio"/> SIZE</li> <li><input type="radio"/> CLIENT LAST MODIFIED</li> <li><input type="radio"/> LAST MODIFIED</li> <li><input type="radio"/> MODIFIED BY</li> <li><input type="radio"/> VERSION CONTROL</li> <li><input type="radio"/> PRODUCTION VERSION</li> </ul> <p><b>HIDDEN COLUMNS (0 OF 8)</b></p>	
	<p>Note: Columns Version Control and Production Version are only visible when version control is enabled.</p>	
Actions column	<p>To show the Actions column on the left, click the  Customize columns and click the Show on left radio button. To show it on the right, click the Show on right radio button.</p> <p>To hide the Actions column, click the Hide radio button.</p>	
 Unlock checked items	<p>Allows you to <a href="#">forcefully unlock</a> selected Bots (multiple) if locked for editing by the Bot Creator in Enterprise client.</p> <p>Note: This option is available only when Version Control is enabled.</p>	
 Delete checked items	<p>Allows you to <a href="#">delete</a> the selected or all Bots or Folders (multiple).</p> <p>Note: This option is not available when Version Control is enabled.</p>	

## Create and Edit Folders

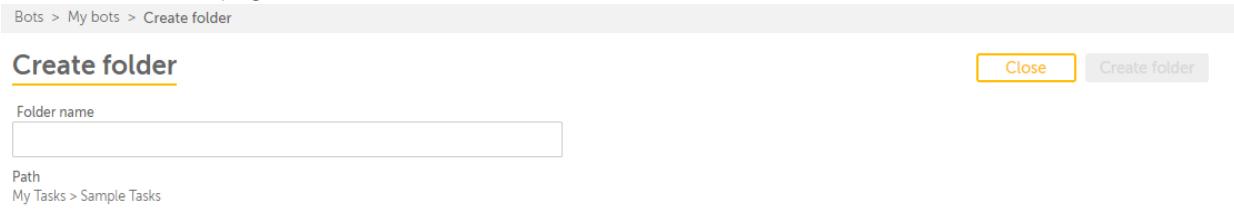
As a Enterprise Control Room user with View my bots and Create Folder privileges, you can create folders in the Enterprise Control Room repository.

This enables you to grant access privileges to Bot Creators/Bot Runners to specific folders so that they can upload, download, delete, and/or execute (MetaBots only) their Bots to the Enterprise Control Room.

If you have Edit Folder privileges, you can also rename the folders to which you have access.

### Create a folder

1. Go to Activity My Bots Folders area
2. Click a folder in the Folders tree view to open it. For example, My Tasks Sample Tasks:
3. Click  that is given above the Files and folders list
4. The Create folder page is launched:



5. Provide an appropriate name. For example, you might want the Bot Creator with Analytics license to store tasks to the Analytics-Task folder.
6. Click **Create folder** to save the folder.

Alternatively, click **Cancel** if you do not want to save changes and go back to the My Bots page.

7. The folder is added which can be viewed in the Folders tree view and Files and folders list:

### Rename a folder

For some reason, such as a typo or change in naming conventions, you might want to rename a folder. This section describes how to rename the folder.

1. Go to Activity My Bots Folders area
2. Click a folder in the Folders tree view to open it. For example, My Tasks Sample Tasks.
3. In the Files and folders list, hover over the actions icon -  for the folder that you want to rename. This slides open the actions panel.
4. Click . The Edit folder page is launched:
5. Update the folder name as required:
6. Click Save changes.

Alternatively, click Cancel if you do not want to save changes.

## Audit Logs

- When you Create and/or Rename a Folder, the following audit entries are logged:

**Audit log**

Time filter: Last 24 hours

Action type: Search action type

Action type: create folder Action type: rename folder

Actions (4 of 1329)

Status	Time	Action Type	Item Name	Action Taken By	Source Device	Source
Successful	12:12:45 IST 2018-03-09	Create Folder	Analytics-Tasks	mike.lee	UNSET	Control Room
Successful	11:27:44 IST 2018-03-09	Rename Folder	Analytics Tasks	mike.lee	UNSET	Control Room
Successful	11:08:32 IST 2018-03-09	Rename Folder	Analytics-Tasks	mike.lee	UNSET	Control Room
Successful	10:54:55 IST 2018-03-09	Create Folder	Analytics Tasks	mike.lee	UNSET	Control Room

## View Bot Details

View bot page provides information, such as the name and other details of the bot. Besides this, you can either run the bot or schedule when to run the bot.

When you click the View icon for a bot in the Files and folders area of My bots page, the View bot page is opened. This page is illustrated in the following figure.

Bots > My bots > View bot

**Download\_File.atmx**

Run bot now Schedule bot

**TASK BOT DETAILS**

Size 87.41 KB	Path My Tasks > Sample Tasks	Client last modified 18:49:56 IST 2018-03-06
------------------	---------------------------------	--

**Review dependencies for Download\_File**

- Automation Anywhere\My Tasks\Sample Tasks\Download\_File.atmx
- Automation Anywhere\My Tasks\Sample Tasks\Variables.atmx
- Automation Anywhere\My MetaBots\Inventory Management>Create Vendor Logic.mbot
- Automation Anywhere\My Tasks\Active Directory\Active\_Directory.atmx

**GENERAL DETAILS**

Last modified 18:51:02 IST 2018-03-06	Modified by mike.lee	Bot type Task Bot	Object type Bot
---	-------------------------	----------------------	--------------------

When version control is enabled and the production version is set, the View bot page also displays the Production version and Version control fields.

Note: If the Automatically assign the latest version option is selected in the Settings Bots (Version Control) page, all the production version of the bot is set to the latest version. For more information, see [Bots - Configure Version Control](#).

Note:

- When version control is enabled, the dependencies that are displayed is based on whether the production version is enabled or not.
- When production version is enabled, the dependencies for that production version of the bot and its dependents are displayed.
- When production version is not enabled for any dependent file, the dependency information for that bot is not displayed.

The different areas of the View bot page are described in the following table.

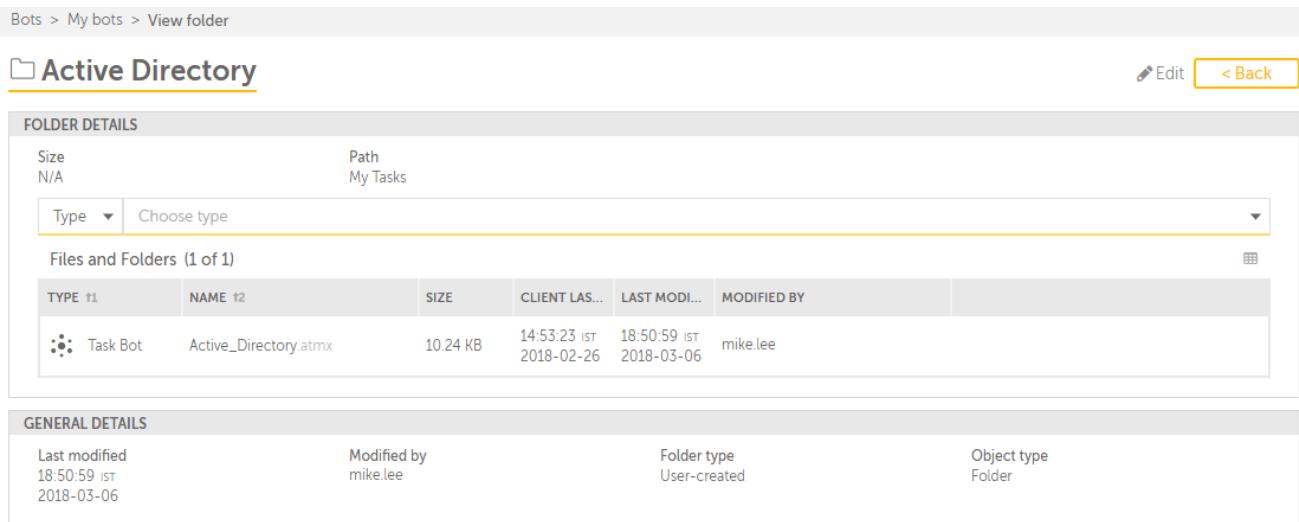
Area	Description
TaskBot details	<p>Use this area to view the following details of the folder</p> <ul style="list-style-type: none"> <li>• Size: Displays the size of the bot in KB or MB</li> <li>• Path: The location of the bot</li> <li>• Production version: The production version that is set either manually or assigned automatically</li> <li>• Version Control: The status of the bot - whether locked or un-locked for editing by the Bot Creator.</li> <li>• Client Last Modified: The date on which the file was last modified on the Bot Creator machine before it was uploaded to the Enterprise Control Room.           <ul style="list-style-type: none"> <li>• If Version Control is enabled and the Production Version is set, the date is the one when that particular production version was last set by Enterprise Control Room user.</li> </ul> </li> </ul> <p>Note: Production version and Version control details are visible only when Version Control is enabled.</p>
Review dependencies for <bot name>	<p>Displays the bot and its dependencies.</p> <p>The dependency icon -  will display red if you do not have sufficient privileges for the dependent bot or file.</p>
General details	<p>Use this area to view the following details for the folder.</p> <ul style="list-style-type: none"> <li>• Last modified: Displays the last time changes were made to the folder in date and time.</li> <li>• Modified by: Displays the name of the user who last made changes to the folder in date and time.</li> </ul>

- |  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>• Bot type: Displays the type of the bot, such as TaskBot or MetaBot.</li> <li>• Object type: Displays the object type, such as bot.</li> </ul> |
|--|--|

## View Folder Details

You can use the View folder page to view the details of the folder and search for items within the folder.

When you click the View icon  for a folder in the Files and folders area, the View folder page is opened. This page is illustrated in the following figure.



The screenshot shows the 'Active Directory' View folder page. At the top, there's a breadcrumb navigation: 'Bots > My bots > View folder'. Below that is the title 'Active Directory' with a back button. The main content is divided into several sections:

- FOLDER DETAILS:** Shows Size (N/A) and Path (My Tasks). A dropdown menu 'Type' is set to 'Choose type'. A table lists one item: 'Task Bot' named 'Active\_Directory.atmx' with size 10.24 KB, created on 2018-02-26 at 14:53:23 IST, modified on 2018-03-06 at 18:50:59 IST by 'mike.lee'.
- GENERAL DETAILS:** Shows last modified (18:50:59 IST, 2018-03-06), modified by ('mike.lee'), folder type ('User-created'), and object type ('Folder').

The View folder page is divided into the following areas.

- Folder details
- Items in folder
- General details

These are explained in the following table.

Area	Description
Folder details	<p>Use this area to view the following details of the folder</p> <ul style="list-style-type: none"> <li>• Size: Displays the size of the folder.</li> <li>• Path: The path of the folder.</li> </ul>
Items in folder	<p>Use this area to search and view the following details for items in the folder.</p> <ul style="list-style-type: none"> <li>• Type: The type of the item, such as TaskBot, MetaBot, or IQ Bot.</li> <li>• Name: The name of the item.</li> <li>• Size: The size of the item in KB or MB.</li> </ul>

	<ul style="list-style-type: none"> <li>Client Last Modified: The date on which the file was last modified on the Bot Creator machine before it was uploaded to the Enterprise Control Room.           <ul style="list-style-type: none"> <li>If Version Control is enabled and the Production Version is set, the date is the one when that particular production version was last set by Enterprise Control Room user.</li> </ul> </li> <li>Last Modified: Displays the last time changes were made to the item in time and date.</li> <li>Modified: Displays the name of the user who last made changes to the item</li> </ul>
General details	<p>Use this area to view the following details for the folder.</p> <ul style="list-style-type: none"> <li>Last Modified: Displays the last time changes were made to the folder in date and time.</li> <li>Modified by: Displays the name of the user who last made changes to the folder in date and time.</li> <li>Object type: Displays the type of Object, such as folder or sub-folder.</li> </ul>

## Folders Area

The folders area allows you to explore and browse your documents, executable files, MetaBots, Reports, Scripts, tasks, and workflows.

The view may differ from user to user depending on their roles and privileges.

When you click a folder, the contents of the folder are displayed in the [Files and Folders area](#).

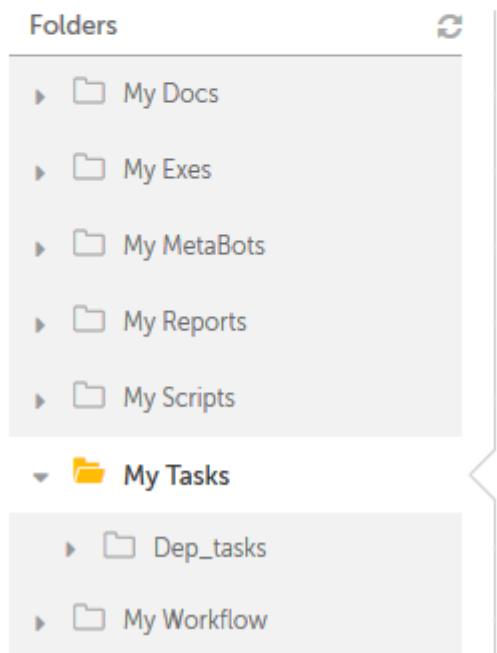
Control Room

Bots > My bots

## My bots

To see files here, upload them from your Bot creator or from a bot that you have permission to see.

You can run locked files. A lock icon means that the file is currently running or has been locked by another user.



### Run a Bot

The bots must be checked into a Control Room repository so that they are available for production deployment. Users with Run my Bots privileges may then deploy and execute the bots from the In progress, Scheduled, or My Bots page.

### Prerequisites

- Ensure you have Run my bots privilege.
- Ensure a client with Bot Runner license is connected to the Enterprise Control Room.

### Procedure

1. Login to Enterprise Control Room.

2. Click Bots > My bots.

My bots page that has only the bots created by users with Unattended Bot Runner license is displayed.

Note: You cannot run bots created by users with attended Bot Runners license.

3. Click Run bot > Run bot now.

Run bot now page is displayed.

4. Under Select a TaskBot tab, select a folder that contains bots.

The TYPE and NAME of the bot are displayed.

Note: You can only access the folders for which you have Run+Schedule privileges.

5. Select a TaskBot.

6. Click the  icon.

The bot is added to the Review dependencies for Files-Folders section.

Note: When you run a bot, automation can fail if:

- Any of the bot dependencies are missing.
- You do not have folder privileges for the dependencies.
- You do not have Run+Schedule privileges (  icon appears).

7. Click Next.

Available devices and bot runners in the Enterprise Control Room are displayed.

8. (Optional) Select Run Bot Runner Session on Control Room.

This allows the Enterprise Control Room to take Remote Desktop Protocol (RDP) of the Bot Runner machine to run a scheduled task, if it is in locked or logged off state. This method is recommended when Bots are deployed on virtual machines and terminal servers. See [RDP based approach to bot deployment - Guidelines](#).

9. Select any bot under the Available bot runners section, and click the  icon.

Note: You can only select a connected Bot Runner devices, as disconnected devices are not enabled.

Also, if a device is not displayed, ensure the device has an active Bot Runner session.

10. Click Next.

11. (Optional) Under the General tab, update the Name and Description.

By default, a name is available for automation in the [bot name].[DD.MM.YY][HH.MM.SS].[USERNAME] format, which you may change as per your preference.

12. Click Run Now.

The selected bot is initiated and you can view the progress under the In Progress activity page.

Note: Run now is disabled if the device is disconnected or the required fields are not filled.

**• RDP based approach to bot deployment - Guidelines**

When you deploy a bot from the Enterprise Control Room to any Bot Runner, it attempts an auto-login (if the Bot Runner is locked or logged off). However, auto-login is prone to security policies set on the machine. Therefore, certain policies may have to be relaxed for the auto-login function. To reduce these issues, you can use Remote Desktop Protocol (RDP) based bot deployment that is introduced in Enterprise Control Room from AAE 10SP2.

Related reference

[RDP based approach to bot deployment - Guidelines](#)

# RDP based approach to bot deployment - Guidelines

When you deploy a bot from the Enterprise Control Room to any Bot Runner, it attempts an auto-login (if the Bot Runner is locked or logged off). However, auto-login is prone to security policies set on the machine. Therefore, certain policies may have to be relaxed for the auto-login function. To reduce these issues, you can use Remote Desktop Protocol (RDP) based bot deployment that is introduced in Enterprise Control Room from AAE 10SP2.

What is RDP based bot deployment?

When a bot is deployed from Enterprise Control Room onto a Bot Runner, the Enterprise Control Room handles the Bot Runner session through RDP, and executes the bot.

## Key features and benefits

- The bot runs in the Bot Runner's RDP session in the Enterprise Control Room in the background. This ensures that no activities are visible on the Enterprise Control Room.
- Auto-login issues are reduced as it is not attempted.  
Note: Auto-login is only attempted if RDP fails.
- As the Bot Runner machine does not log in automatically; the security issues related to 'live monitor' scenarios are also reduced.

To ensure that the RDP based bot deployment works seamlessly, there are certain prerequisites and settings necessary on the Enterprise Control Room and the Bot Runner machine. The following section elaborates these prerequisites.

## Pre-requisites

### Settings on Bot Runner

- No legal disclaimer on the Bot Runner.

There cannot be any legal disclaimer dialogs coming up when a user logs into the Bot Runner. Legal disclaimers can be disabled through group or local policies.

- The RDP connection must be enabled on Bot Runner.
  1. Enabling RDP on Bot Runner machine.

On the Bot Runner machine, ensure that remote connections to Bot Runner are allowed from My Computer properties. Ensure you select the Allow connections only from... check box.

2. Enabling RDP on Bot Runner on Virtual Machine (Azure, VMWare, Oracle Virtual Box).

To enable RDP on the Virtual Machine, refer to appropriate documentation on the Virtual Machine host.

3. Enabling RDP on Bot Runner hosted on Citrix XenDesktop.

See <https://support.citrix.com/article/CTX129184/>.

4. Enabling RDP on Bot Runner hosted on Terminal Server.

Refer to the documentation on Managing Remote Desktop Services Connections.

For Windows Server 2008 R2, see [https://technet.microsoft.com/en-us/library/cc772051\(v=ws.11\).aspx](https://technet.microsoft.com/en-us/library/cc772051(v=ws.11).aspx).

Also, the user session on the Terminal Server must be restricted to a Single Remote Desktop Services session.

Click Computer Configuration > Administrative Templates > Windows Components > Remote Desktop Services > Remote Desktop Session Host > Connections. Ensure the Restrict Remote Desktop Services users to a single Remote Desktop Services session is enabled.

Note: Same user cannot log in multiple times to the Terminal Server. However multiple users are not restricted from connecting to the the Terminal Server.

Ensure the Bot Runner machine is allowed to accept incoming RDP requests/connection with saved credentials. You can do this by disabling the group policy Bot Runner machine under Computer Configuration > Administrative Templates > Windows Components > Remote Desktop Services > Remote Desktop Session Host > Security Always prompt for password upon connection.

When the group policy is enabled, during RDP Client login (for example, AARemoteMachineConnector.exe), credentials input is prompted as the target machine does not accept the incoming connections through any RDP client in which user has supplied credentials.

#### Enterprise Control Room settings

- Allow connections even when there are certificate errors.

On the Enterprise Control Room, ensure the Don't ask me again for connections to this computer option is enabled.

- In the Enterprise Control Room AppServer machine, user executing the Automation Anywhere Control Room Service must have admin rights (for UI Session) to run AARemoteMachineConnector.exe.
- If the Enterprise Control Room cannot resolve the IP address of the Bot Runner under the Devices tab, 'RDP deployment not getting triggered' message appears. Use the nslookup command (for example, C:\> nslookup WIN-56888IBQ23P) to review this issue, and contact the administrator for further assistance.

Note: It is mandatory that the Enterprise Control Room obtains the IP address with the Bot Runner name that is displayed in the Devices tab.

#### Changing screen resolution for Bot Runner session on Enterprise Control Room

It is recommended that you add the screen resolution configuration of the Bot Runner machine. This ensures your automation runs seamlessly during RDP based deployment, even if the resolution of screen varies between Bot Runner and Enterprise Control Room. You can do this by configuring the 'deployment.properties' file of the Enterprise Control Room at the following location:

```
C:\Program Files\Automation Anywhere\Enterprise\Config\deployment.properties
```

Add the following:

```
rdp.desktop.height=768
```

```
rdp.desktop.width=1366
```

```
rdp.port=3389
```

Note: Configure the height, width, and port value as per your requirement.

- [FAQs](#)

While every effort is made to address all possible questions, please contact us if you have additional questions that must be included.

Related reference

[FAQs](#)

## FAQs

While every effort is made to address all possible questions, please contact us if you have additional questions that must be included.

Is there one RDP session per Bot Runner?

Yes.

Do I need to ramp up the Enterprise Control Room RAM for RDP Based Deployment?

You may ramp it up depending on the bot deployment scenarios. A typical RDP session takes around 150MB of RAM. So, if you are deploying onto 10 Bot Runner, 1.5GB RAM is consumed. It is recommended that you increase the RAM to 16 GB if extensive bot deployment is required. Refer the Hardware Requirements section for Enterprise Control Room in the AAE - Installation Guide that is shipped with the product.

Will the RDP sessions terminate when the bot is executed?

Yes.

Can a Enterprise Control Room user see the active RDP Session?

No. User cannot see the active RDP Session as it is a background process. However, the user can see it under the Task Manager > Processes tab.

While the bot is executed in a RDP session on the Enterprise Control Room, if the Bot Runner user logs in to the Bot Runner, does it impact the bot execution?

As soon as the user logs in to the Bot Runner, the RDP session on the Enterprise Control Room terminates. The bot continues to run, and is visible to the user on the Bot Runner.

In the above scenario, if the user locks/logs off/disconnects the RDP session on the machine, what happens to the current executing bot?

If a user locks/disconnects the RDP session, the bot continues to run in the background. However, the screen based commands may display errors. If a user logs off the RDP session, the bot execution is terminated.

While selecting Remote based bot deployment, the AA player is taking more time to come up. Is the performance affected by new functionality?

No, there is some delay in the AA player to come up as first the RDP connection must be made. And in environment where there is high latency, the RDP connection itself can be slow.

What is the impact if RDP connection is very slow?

Let us assume that the Enterprise Control Room takes about 30 seconds to RDP. The bot execution start-up is delayed by 30 seconds for that Bot Runner. Beyond that, if RDP session does not get connected, then the Enterprise Control Room deploys the bot through the legacy route (auto-login).

If there is already active RDP (manually done by the user) and if the bot starts, will the existing RDP session be taken from user?

Older RDP session is disconnected and the task is executed on new RDP Session, which is created by Enterprise Control Room.

If RDP Session crashes in between bot execution, does the Enterprise Control Room restart the session without impacting bot execution?

Yes, RDP has an inbuilt capability to reconnect. But that works only for certain duration. So, if Bot Runner gets disconnect for longer time, then it impacts the execution of the bot.

Further to the above scenario, there is possibility of bot displaying errors due to RDP disconnection. How would a developer/Enterprise Control Room User differentiate a failure between RDP and Actual bot error? If not, a developer may spend long time (impacting production execution) analyzing the code while the actual impact was due to RDP session, which may not require any code change.

If bot displays errors, then it is automatically audited in the Enterprise Control Room. For RDP disconnect case, we have kept the list of reasons for disconnection and we are storing this in a log file. See [IMsTscAxEvents](#).

If RDP Session crashes, is the occurrence and status of bot captured in the Audit log even though the RDP crashed?

Yes, the bot continues to run on Bot Runner and the required audit of success or failure is logged.

We have occasional RDP session timeouts. Will Enterprise Control Room RDP be impacted by it?

Ideally, there cannot be any RDP TIMEOUT as it can impact the execution of the bot.

Does the RDP based Bot Deployment work with Bot Schedules as well?

Yes, there is an option to select the RDP based Bot Deployment while scheduling the bot from Enterprise Control Room.

Can it be configured with other RPD tools like VMware clients?

It cannot be configured currently, but may be in one of the future updates.

If a user's Active Directory (AD) password has changed when the Enterprise Control Room tries to RDP, will it update the new password by syncing with the AD?

No. Enterprise Control Room will only fetch the password which is set in Automation Anywhere Enterprise Credential Vault.

If a bot is scheduled to deploy onto a 100 Bot Runner, will the Enterprise Control Room invoke RDP onto all 100 Bot Runners asynchronously or sequentially?

RDP sessions are created on the Enterprise Control Room box and deploys the bot asynchronously on these Bot Runners.

Consider a scenario where a bot is deployed onto 10 Bot Runners. If Enterprise Control Room is unable to RDP onto the fifth Bot Runner, will it move onto the sixth Bot Runner, or the entire process is aborted?

As it is happening in parallel, RDP failure of one Bot Runner does not impact the other. The Enterprise Control Room moves onto the next Bot Runner.

If Bot Runner is unable to terminate the RDP session, is the Enterprise Control Room admin notified or is it logged in the Audit trail?

The Enterprise Control Room admin must manually terminate the Bot Runner's RDP session.

Will this work if the Enterprise Control Room is hosted in load-balanced high-availability disaster recovery (HA-DR) mode; where multiple Enterprise Control Room Application Servers are installed? If yes, on which Enterprise Control Room machine will the RDP sessions run?

Yes, this works in the HA-DR mode. In that case, the RDP sessions are deployed on the Enterprise Control Room Server that deploys the bots.

## Delete bot(s) and folder(s)

As a Enterprise Control Room admin or user with Delete Bot privileges, you can delete one or more bots and Folders that are uploaded by a Bot Creator from the Enterprise client. This option is not available when version control is enabled.

### Delete a bot

You can delete a bot (single) that is uploaded by the Bot Creator from Enterprise client.

To delete a bot from the Enterprise Control Room,

1. Go to Bots > My Bots. The My Bots page is launched.
2. In the Files and folders list mouse over  for the bot that you want to delete.
3. Click .
4. Select Yes, delete to confirm. The bot is deleted permanently.

Select No, cancel to go back to the Files and folders list without deleting the bot.

Note:  You cannot delete a bot that is listed in one or more active or inactive schedules. You must delete the schedule before deleting the bot.

### Delete multiple bots

You can delete selected bots (multiple) that are uploaded by the Bot Creator from Enterprise client.

To delete Bots from the Enterprise Control Room:

1. Go to Bots > My Bots. The My Bots page is launched.
2. In the Files and folders list select bots that you want to delete by clicking the corresponding check-boxes.
3. Click  given above the table.
4. Select Yes, delete to confirm.

Click No, cancel to go back to the Files and folders list without deleting the Bots.

Note: **11.3.2** If any of the selected bot(s) is listed in one or more active or inactive schedule, that bot(s) can not be deleted.

## Delete folder(s)

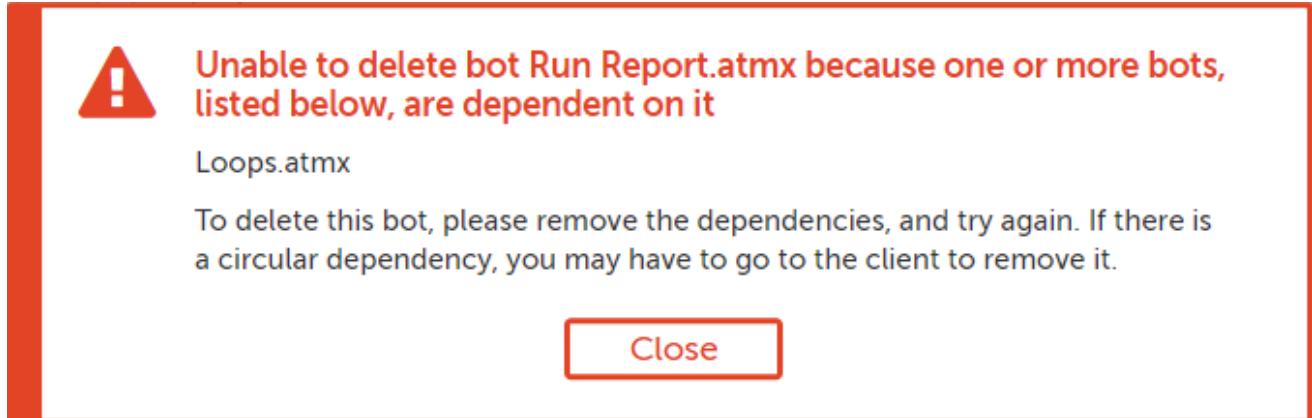
The method to delete Folder(s) is similar to deleting Bot(s). You can choose to delete multiple folders from table level or individually from files and folders list.

The folder that you want to delete should be empty.

## Delete dependent bots and files

When you delete Bot(s), its dependent Bots and Files are not deleted automatically. If you do not require those, you will have to delete them manually from the folder where they reside.

When you try to delete a bot that is part of another bot as a dependency, you are shown:



## Audit Log

For all the Bot(s) that are deleted, audit entries are logged in the Audit Logs page.

## Force unlock bots

As a Enterprise Control Room user with Unlock Bot privileges, you can forcefully unlock one or more Bots that are checked out by a Bot Creator in the Enterprise client. This option is available only when version control is enabled.

## Unlock a bot

You can forcefully unlock a bot (single) if locked for editing by the Bot Creator in Enterprise client.

To unlock a checked out Bot from the Enterprise Control Room,

1. Go to Bots > My Bots.

The My Bots page is launched.

2. In the Files and folders list for the Bot that is locked, mouse over .
3. Click  .
  - Select Yes, unlock to confirm. The Bot is unlocked successfully.
  - Select No, cancel to go back to the Files and folders list without unlocking the Bot.

## Unlock multiple Bots

You can forcefully unlock selected Bots (multiple) if locked for editing by the Bot Creator in Enterprise client.

To unlock checked out Bots from the Enterprise Control Room,

1. Go to Bots > My Bots.

The My Bots page is launched.

2. In the Files and folders list select Bots that are locked by clicking corresponding check-boxes.
3. Click  given above the table.
  - Select Yes, unlock to confirm.
  - Click No, cancel to go back to the Files and folders list without unlocking the Bots.

If Bots that are already in Unlocked state are selected, the Enterprise Control Room skips unlocking them.

## Audit Logs

For all the Bot(s) that are forcefully unlocked, audit entries are logged in the Audit log page.

The status of an unsuccessful unlock is shown with its reason in the Results column of the Audit logs details page.

## Bot Lifecycle Management (BLM) - an overview

As a Enterprise Control Room user with Export and/or Import Bots module permission, you can move your bots (new or updated) from one environment to another using Bot Lifecycle Management (BLM) module in Enterprise Control Room. For example, you can move the Bots that are verified as production ready from staging to production.

The process can be performed in two stages:

1. [Export Bots](#) from one environment of a source Enterprise Control Room
2. [Import Bots](#) to another environment of a destination Enterprise Control Room

You can choose to Export and Import using two methods:

1. Enterprise Control Room user interface i.e. Export and Import Bots
2. [API to export and import Bots for Bot Lifecycle Management](#)

## Export bots

As a Enterprise Control Room user with BLM Export module permission and download privileges for Tasks, Docs, Workflows, and Reports and execute permission for MetaBots, you can export bots and dependent files in different automation environments to help manage your organization's Bot Lifecycle Management (BLM).

The exported package can then be imported in another Enterprise Control Room environment. Refer [Import bots](#) for details on importing a BLM package.

## Export bot files - version control disabled

1. Go to Bots > My Bots page
2. Click [Export bot files...](#)

This launches the Export bot files wizard Select Bots page wherein you must select the bots that you want to export.

3. Select TaskBot(s) from the list of Available items. You can choose either all files by selecting the check-box in the header row or certain files by selecting the check-box beside each.
4. Click or to add the bots to the list of Selected bots given below the Available items list:

**Selected (4)**

<input type="checkbox"/>	TYPE	NAME ↑	PATH
<input type="checkbox"/>	Task Bot	Analytics_MortqaqeProcessing.atn	Automation Anywhere
<input type="checkbox"/>	Task Bot	Files-Folders.atmx	Automation Anywhere
<input type="checkbox"/>	Task Bot	Import-Table.atmx	Automation Anywhere
<input type="checkbox"/>	Task Bot	Loops.atmx	Automation Anywhere

**Next >**

Note: The Selected bots panel will be available either below the Available items list or on the right of the list based on your screen's resolution. If it is below, the down arrow will be available and if on the right, the right arrow will be available for bot selection.

5. Click Next.
6. This launches the Export bot files wizard Summary page wherein you can provide the Export package name and/or choose to exclude a bot or dependency file from the list.

a) The system assigns a default Export package name. However, you can choose to rename the package.

b) You can also choose to provide a Password that will be used to import the package. The password should be set as per the Enterprise Control Room password policy and one that can be easily remembered.

Note: The provided password is not stored anywhere in the Enterprise Control Room. If you provide a password the package is encrypted with AES 256-Bits and cannot be accessed outside of Enterprise Control Room.

c) If the TaskBot comprises dependent bots (TaskBots, MetaBots) and/or files, they are also automatically selected for export. The Dependency Type for these bots is shown as User selected if the Bot/File was added by a user manually or as Supports <bot path>/<bot name> if it was included automatically by the system. This allows you to include or exclude a bot from the export package based on your automation flow.

Note: If any dependent file appears more than once, it is included in the package only once.

7. Click Export. The package is successfully exported to the default folder for downloads.

For messages related to export, refer the section [Export bot files - Validations](#)

## Export bot files - version control enabled

Before you use Export bot files in a Enterprise Control Room that has version control, ensure that the production version of bots and their dependencies is already set.

To export bot files,

1. Go to Bots > My Bots page
2. Click  [Export bot files...](#). This launches the Export bot files wizard > Select Bots page wherein you must select the bots that you want to export.
1. Select TaskBot(s) from the list of Available items. You can choose either all files by selecting the check-box in the header row or certain files by selecting the check-box beside each.

2. Click  or  to add the bots to the list of Selected bots given below the Available items list:

**Selected (4)**

<input type="checkbox"/>	TYPE	NAME ↑	PATH
<input type="checkbox"/>	Task Bot	Analytics_MortqaqeProcessing.atn	Automation Anywhere
<input type="checkbox"/>	Task Bot	Files-Folders.atmx	Automation Anywhere
<input type="checkbox"/>	Task Bot	Import-Table.atmx	Automation Anywhere
<input type="checkbox"/>	Task Bot	Loops.atmx	Automation Anywhere

**Next >**

Note: The Selected bots panel will be available either below the Available items list or on the right of the list based on your screen's resolution. If it is below, the down arrow will be available and if on the right, the right arrow will be available for bot selection.

3. Click Next.
4. This launches the Export bot files wizard Summary page wherein you can provide the Export package name and/or choose to exclude a bot or dependency file from the list.
- The system assigns a default Export package name. However, you can choose to rename the package.
  - You can also choose to provide a Password that will be used to import the package. The password should be set as per the Enterprise Control Room password policy and one that can be easily remembered.
- Note: The provided password is not stored anywhere in the Enterprise Control Room. If you provide a password the package is encrypted with AES 256-Bits and cannot be accessed outside

of Enterprise Control Room.

Bots > My bots > Export bots and files

TYPE	NAME	PATH	PRODUCTION VERSION	DEPENDENCY TYPE	
<input checked="" type="checkbox"/>	Create Vendor Logic.mbot	Automation Anywhere\My Me...	33	Supports Automation Anywhere\My Ta...	
<input checked="" type="checkbox"/>	Task Bot	Files-Folders.atmx	Automation Anywhere\My Ta...	27	User selected
<input checked="" type="checkbox"/>	Task Bot	Loops.atmx	Automation Anywhere\My Ta...	32	User selected
<input checked="" type="checkbox"/>	Task Bot	Variables.atmx	Automation Anywhere\My Ta...	23	User selected
<input checked="" type="checkbox"/>	Task Bot	Import-Table.atmx	Automation Anywhere\My Ta...	26	User selected
<input checked="" type="checkbox"/>	Task Bot	Run Report.atmx	Automation Anywhere\My Ta...	22	Supports Automation Anywhere\My Ta...

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- c) Only those TaskBots and MetaBots are available for selection for which production version is set. Hence, if the production version is not set for TaskBots and MetaBots, they cannot be exported. For other types - Docs, Workflows, and Reports, the files with latest version are allowed for export.
- d) If the TaskBot comprises of dependent bots (TaskBots, MetaBots) and/or files, they will also be selected for export. The Dependency Type for these bots is shown as User selected if you select the bot manually or as Supports <bot path>/<bot name> if it is included automatically because it is a dependency. This allows you to include or exclude a bot from the export package based on your automation flow.

Note: If any dependent file appears more than once, it is included in the package only once.

#### 5. Click Export.

- Click Cancel if you do not want to proceed.
- Click Back to go to previous page.

The package is successfully exported to the default folder for downloads.

For messages related to export, refer the section [Export bot files - Validations](#)

Note: If the Email settings are enabled for Export and Import operations of a BLM package, an email notification is sent to the user who performs the export whether the action succeeded or failed.

## Export bots - Validations

When you export bot files, the system checks for following validations during export:

- Whether bot or dependent file is available in Enterprise Control Room
- Whether you have download permission (Execute permission for MetaBot) on one or more bot or dependent files of selected bot(s)
- Whether the production version is set for all selected bot(s) or dependent file(s)

If any of the validation fails for one or more bots, those are automatically excluded from the package and shown in the Items not allowed to export section. You can choose to either fix those error messages and come back to export or you can export rest of the bots as shown in the Items to export section.

Bots > My bots > Export bots and files

**Export bots + files**

**BOTS & FILES**  • 4 bots + files

**PACKAGE SUMMARY**  • Finance bots package  
• 2 bots + files + dependencies

**Where do you want to export these files to?**

The table below shows all the files that you selected along with any dependencies that you did not select. You may unselect any bot or dependency that you do not want to export.

Some bots can not be exported, you may proceed to export rest of the bots.

Export package name: Finance bots package Password (optional):

Items not allowed to export (2 of 2)

TYPE	NAME	PATH	REASON
Task Bot	Download_File.atmx	Automation Anywhere\My Tasks\Sample T...	No Download/Execute access on Bot or d...
Task Bot	Loops.atmx	Automation Anywhere\My Tasks\Sample T...	Bot or dependency is not present in Contr...

Name:  Search name:

Items to export (2 of 2) 2 selected

TYPE	NAME	PATH	DEPENDENCY TYPE
Task Bot	Analytics_MortgageProcessing.atmx	Automation Anywhere\My Tasks\Sam...	User selected
Task Bot	Import-Table.atmx	Automation Anywhere\My Tasks\Sam...	User selected

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## Audit Logs

An audit entry is logged in the Enterprise Control Room Audit Log page when you export bots.

Related concepts

[Audit log overview](#)

## Import bots

As a Enterprise Control Room user with BLM Import module permission, and Upload privileges for Tasks, MetaBots, Docs, Workflows, and Reports, you can import bots and dependent files that were exported by another Enterprise Control Room user in different automation environments to help manage your organization's Bot Lifecycle Management (BLM).

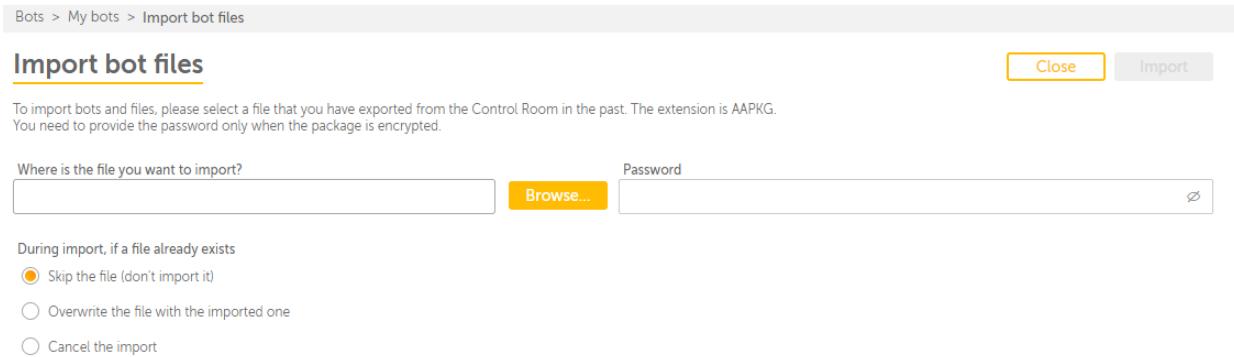
## Before you import bots and files

Before you import bots from Enterprise Control Room versions earlier to 11.2.x to Enterprise Control Room Version 11.3.1, ensure the bot names do not comprise of unicode characters. If the bot names have unicode characters, rename the bot in the earlier 11.2.x version and export again or export the same bot from 11.3 and then import to Enterprise Control Room 11.3.1.

## Import bot files - version control disabled

To import bot files,

1. Go to Bots > My Bots page
2. Click  Import bot files...
3. This launches the Import bot wizard page wherein you must select the package file that was exported by another Enterprise Control Room user:



To import bots and files, please select a file that you have exported from the Control Room in the past. The extension is AAPKG. You need to provide the password only when the package is encrypted.

Where is the file you want to import?

Password

During import, if a file already exists

Skip the file (don't import it)

Overwrite the file with the imported one

Cancel the import

4. To select the file, click Browse.
5. Go to the source folder where the exported package was stored and/or shared by the Enterprise Control Room user with Export Bots privileges.
6. Select the required package - it has an AAPKG extension.
7. If encrypted, provide the same password that was used for export from source Enterprise Control Room.
8. If some of the files that are being imported from the package are already available in the Enterprise Control Room, you can choose to,
  - Skip the file(s) and not import the duplicate files
  - Overwrite the existing files with the imported ones
  - Cancel the import action.

Note: When you use this option, the entire import operation is canceled and if at least one file already exists in Enterprise Control Room. In this case, no bots will be imported into Enterprise Control Room.

  - When you select Skip... or Overwrite... options, and click Import the files are successfully imported.
  - However, when you select Cancel... and click Import, you are prompted to select either of the above options.

Bots > My bots > Import bot files

**⚠️ Unable to import the bots. Package is not imported because following bots already existed in Control Room.**

This is due to the following reasons:

- Automation Anywhere\My Tasks\Sample Tasks\Variables.atmx
- Automation Anywhere\My Tasks\Sample Tasks\Prompt.atmx

Please select Skip or Overwrite option and try again.

**Import bot files**

To import bots and files, please select a file that you have exported from the Control Room in the past. The extension is AAPKG.  
You need to provide the password only when the package is encrypted.

Where is the file you want to import?   Password

During import, if a file already exists

Skip the file (don't import it)  
 Overwrite the file with the imported one  
 Cancel the import

9. After the bots are imported successfully, you return to the My Bots page.

## Import bot files - version control enabled

To import bot files,

1. Go to Bots > My Bots page
2. Click 
3. This launches the Import bot files wizard page wherein you must select the file that was exported by another Enterprise Control Room user:

Bots > My bots > Import bot files

**Import bot files**

To import bots and files, please select a file that you have exported from the Control Room in the past. The extension is AAPKG.  
You need to provide the password only when the package is encrypted.

Where is the file you want to import?   Password

During import, if a file already exists

Create a new version  
 Skip the file (don't import it)  
 Cancel the import

Version control of imported files

Keep production version as is currently set  
 Set production version to imported version of file

4. To select the file, click Browse.

5. Go to the source folder where the package was exported and/or shared by the Enterprise Control Room user with Export Bots privileges.
6. Select the required package - it has an AAPKG extension.
7. If encrypted, provide the same password that was used for export from source Enterprise Control Room.
8. If some of the files that are being imported from the package are already available in the Enterprise Control Room, you can choose to,
  - Create a new version of files. A new version is created in the destination Enterprise Control Room irrespective of version control - whether enabled or not in the source Enterprise Control Room.  
Note: If the bot being imported is already present in the destination Enterprise Control Room and does not have any updates, a new version of the bot will not be created.
  - Skip the file and do not import the file. This means that there will be no change in the file of the destination Enterprise Control Room.
  - Cancel the import action.  
Note: When you use this option, the entire import operation is canceled and if at least one file already exists in Enterprise Control Room. In this case, no bots will be imported into Enterprise Control Room.
9. You must choose the production version type,
  - Keep production version as is currently set - The system will not make any change in the production versions of the imported bots and dependencies.
  - Set production version to imported version of file - The latest (imported) versions are set as production versions for all the imported bots and dependencies.
    - When you select Skip... or Create... options, and click Import the files are successfully imported:
    - However, when you select Cancel... and click Import, you are prompted to select either of the above options:

Bots > My bots > Import bot files

**⚠️ Unable to import the bots. Package is not imported because following bots already existed in Control Room.**

This is due to the following reasons:
 

- Automation Anywhere\My Tasks\Sample Tasks\Files-Folders.atmx
- Automation Anywhere\My Tasks\Sample Tasks\Loops.atmx

Please select Skip or Create new version option and try again.

**Import bot files**

To import bots and files, please select a file that you have exported from the Control Room in the past. The extension is AAPKG. You need to provide the password only when the package is encrypted.

Where is the file you want to import?   Password

During import, if a file already exists

Create a new version  
 Skip the file (don't import it)  
 Cancel the import

Version control of imported files

Keep production version as is currently set  
 Set production version to imported version of file

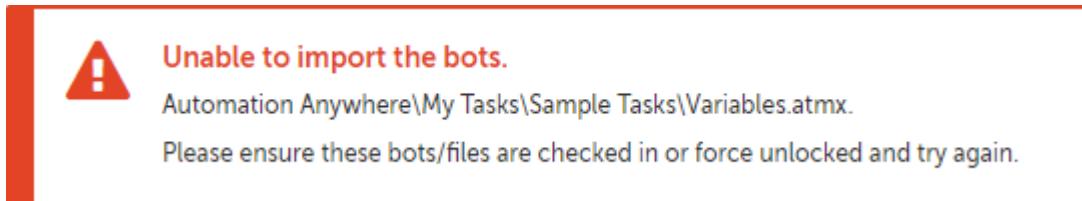
10. After the bots are imported successfully, you return to the My Bots page.

Note: If the Email settings are enabled for Export and Import operations of a BLM package, an email notification is sent to the user who performs import whether the action succeeded or failed.

## Import bots - Validations

When you import bot files, the system checks for following validations during import:

- Whether bot or dependent file already exists in Enterprise Control Room
- Whether a file is locked if version control is enabled. If this validation fails, you are shown:



You can fix this issue from the Enterprise Control Room using Unlock bot or from the Client using Checkin option.

## Audit Logs

An audit entry is logged in the Enterprise Control Room Audit Log page when you import bots.

The audit details are divided in two parts - Action Details and Import Bot Details:

- The Import Bot Details include the Source Enterprise Control Room name, Package Name, Package Encryption if password has been set while exporting the bot, Imported Bot name with filepath, and Imported Dependency name with file path.

**11.3.1** If a file already exists and the user has selected the option - Create a new version, Skip or Overwrite, the status is displayed followed by the name and number of bots or files Imported, Skipped or Overwritten as the case may be. The following illustrates the audit log details when files are skipped:

## 11.3.1

ATTRIBUTE	VALUE
Source Control Room	<a href="http://ec2-54-203-20-232.us-west-2.com...">http://ec2-54-203-20-232.us-west-2.com...</a>
Package Encryption	No
If a file already exists	Skip the file
Skipped File(1)	Automation Anywhere\My Scripts\Sample S... Automation Anywhere\My Scripts\Sample Scripts\CheckFolderExists.vbs
Skipped Bot(2)	Automation Anywhere\My Tasks\Active Dire...
Imported Bot(1)	Automation Anywhere\My Tasks\Sample Ta...
Imported File(2)	Automation Anywhere\My Scripts\Sample S...
Imported Bot Dependency(1)	Automation Anywhere\My Tasks\Sample Ta...
Imported Bot Dependency(2)	Automation Anywhere\My MetaBots\Invent...

- The bots/files entries are displayed in the Attributes column in the following sequence - Skipped/Overwritten, Imported , and Imported Dependency. The number inside the bracket indicates the bot/file number skipped/overwritten or imported.
- The filepath of the imported entity can be viewed by hovering over the filepath in the Value column.
- When Version Control is enabled, the source Enterprise Control Room version of each item in the list are displayed and the version number is appended towards the end of the file.
- If you want to know from which Enterprise Control Room a bot was imported with its version number, you can track it through version history in the Edit bot page

**Edit bot**

**CLOSE** **Save changes**

**TASK BOT DETAILS**

Name Analytics_MortgageProcessing.atmx	Size 15.71 KB	Path My Tasks > Sample Tasks	Client last modified 18:45:14 IST 2018-02-05
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Search description  **SEARCH**

Production version (4 of 4)

VERSION	DESCRIPTION	LAST MODIFIED	MODIFIED BY
28	Imported from 'http://product07.aaspl-brd.com:82/' Control Room. Bot version in Source CR : '23'	18:47:36 IST 2018-04-11	ellie.brown
27	Updated mortage data to reflect mortgage rat...	16:29:40 IST 2018-04-11	mike.lee
23	Uploaded Base version	18:09:43 IST 2018-04-09	ellie.brown
None	N/A	N/A	N/A

- Alternatively, if you want to know from which Enterprise Control Room a bot was imported with its version number, you can also track it through the Version History in the Automation Anywhere Enterprise Client:

**Version History**

**Version History**

Automation Anywhere\My Tasks\Sample Tasks\Analytics\_MortgageProcessing.atmx

Revision ...	Action	Username	Date	Comments
28	Edit	ellie.brown	11-04-2...	Imported from 'http://product07.aaspl-brd.com:82/' Control Room. Bot version in Source CR : '23'
27	Edit	mike.lee	11-04-2...	Updated mortage data to reflect mortgage rate for financial year 2018-2019
23	Add	ellie.brown	09-04-2...	Uploaded Base version

Press 'Ctrl' key to select two different revisions for comparison

**Compare** **Rollback**

## Activity overview

Use the Activity management page to view activities that are scheduled and are in progress. Also view a historical chronology of activities performed on a bot.

To view the information in the Activity section of the Enterprise Control Room, ensure you have View everyone's In progress activity, View my scheduled bots, and View my bots privileges with appropriate folder level permissions.

See [Bot Permissions for a Role](#).

## Manage activities

The Activity section enables you to:

### [In progress activity](#)

Monitor the ongoing automation activities, which you have triggered or scheduled from the In progress activity page of the Enterprise Control Room. Manage one or more automation activities using the pause, stop, or resume operation.

### [Manage scheduled activity](#)

View and manage activities that are scheduled from the Scheduled Activity page. Access the Scheduled activity page by logging on to Enterprise Control Room and clicking Activity > Scheduled

### [Manage historical activity](#)

The Historical activity page captures and chronologically lists the automations that have occurred.

## Perform actions

It also enables you to:

### [Run a Bot](#)

The bots must be checked into a Control Room repository so that they are available for production deployment. Users with Run my Bots privileges may then deploy and execute the bots from the In progress, Scheduled, or My Bots page.

### [Run bot with queue](#)

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

### [Schedule a bot](#)

There are times when you want to run a bot at a later point in time, or when you want the bot to run on a periodic basis, or at a specific point in time. In such cases, use the Schedule bot page to do such tasks.

## In progress activity

Monitor the ongoing automation activities, which you have triggered or scheduled from the In progress activity page of the Enterprise Control Room. Manage one or more automation activities using the pause, stop, or resume operation.

## Permissions required

- View my in-progress activity to monitor and manage all ongoing automations on the bots for which you have either Upload, Download, or Delete permission.
- View everyone's in-progress activity along with View my bots and Run my bots activity permissions to monitor and manage all ongoing automations on the bots with corresponding folder permissions.

## Manage In-progress activity

Use the In-progress activity page to:

View the progress of the bots being downloaded from the Bot Store.

View the in progress automations on Bot Runner machines that have the Run Time window hidden from view.

Apply search parameters to Status, Activity Type, Bot, Queue, Device, and Item Name columns for ease of access.

**Tip:** 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.

Perform the following actions on a column for efficiency:

- 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 or 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 on the data that is currently visible to you. The last sorting is stored in the 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 it to resize it.

Monitor the following in the Activity table:

- Check whether the Status of the activity is:
  - Active (In progress) for a bot running on Bot Runner machines.
  - Paused for a bot that is paused either from the Enterprise Control Room or a device.
  - Unknown for a bot that fails to run for unknown reasons.
  - Waiting for user input for a bot that is paused and requires an input from a user.
- Note: **11.3.3** Only Active status is applicable for the bots and Digital Workers downloaded from the Bot Store.
- The Progress of the activity in percentage.
- Whether the Activity Type is:
  - Run Bot
  - Import queue files
  - Run bot with queue
  - **11.3.3** Bot Store - Download bots
- The time at which the activity was Started On. This is of the format HH:MM:SS YYYY-MM-DD.
- The name of the Bot.

**11.3.3** The name of the bot package being downloaded from the Bot Store.

- Queue name

Note: **11.3.3** This column is not applicable for the bots and Digital Workers downloaded from the Bot Store.

- The Device on which the activity is running.

Note: **11.3.3** This column is not applicable for the bots and Digital Workers downloaded from the Bot Store.

- Username which is an Enterprise Control Room user account used for running the automation on a remote Bot Runner.
- Item Name is the name of the automation.

Perform the following table-level actions for a set of multiple activities.

- Refresh the list of activities given in the table.
- Pause in progress activities that are being performed on the bot.
- Resume in progress activities that were paused.
- Stop in progress activities regardless of the activity stage of a bot.
- Export in progress activities list to a csv file.
- Move to History the selected activities.
- The list of available columns appears when you click the Customize columns icon. Select to add a column.

Perform the following tasks on an activity.

- Select View in progress activity to view activity details.

Note: 11.3.3 This option is not applicable for the bots and Digital Workers downloaded from the Bot Store.

- Select Pause in progress activity to pause an activity.
- Select Resume in progress activity to resume an activity that was paused. This is visible only when you pause the activity.
- Select Stop in progress activity to stop the progress of an activity.
- Select Move in progress activity to move the activity to Historical Activity page.

#### Related concepts

[View in progress activity details](#)

[Manage historical activity](#)

## View in progress activity details

As a Control Room admin or a user with View everyone's In progress activity, View my in progress activity, and Run my bots privilege, you can monitor and manage all ongoing automations on bots with corresponding folder permissions. You can view the ongoing activity in real time.

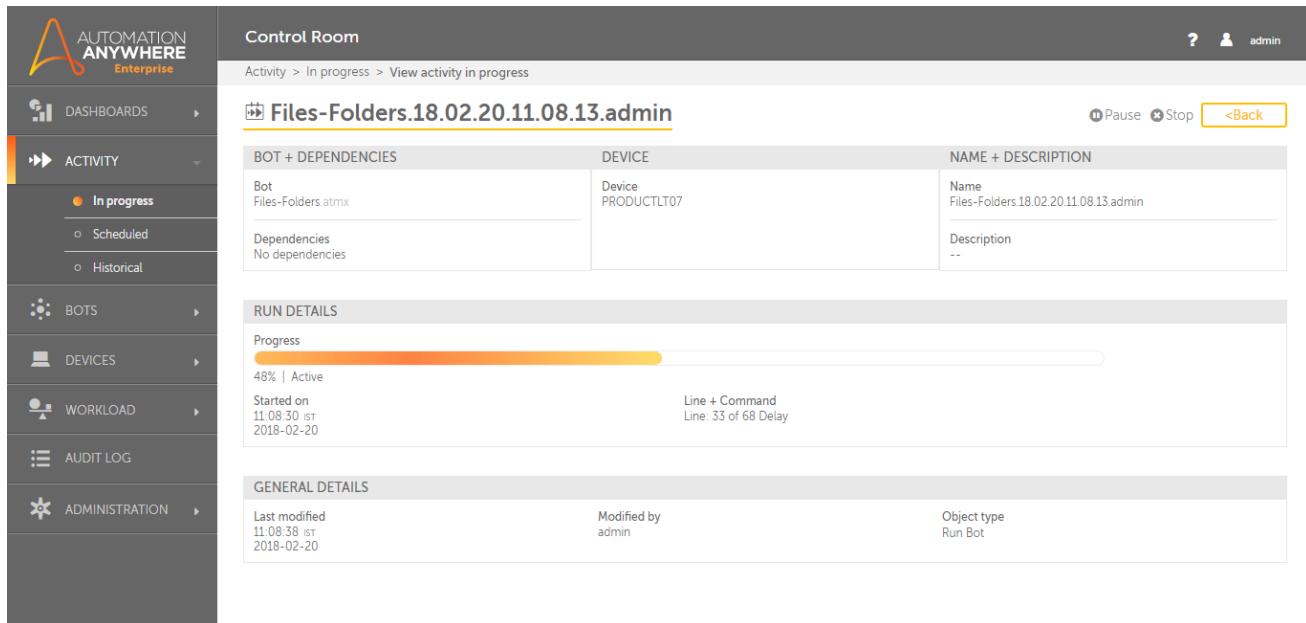
Access the In progress activity page by logging on to Enterprise Control Room and click Activity – In Progress. The in progress activities with different status is illustrated in the following figure.

Activity (4 of 4)							
Status	STATUS	PROGRESS	ACTIVITY TYPE	STARTED...	BOT	DEVICE	QUEUE
<input type="checkbox"/>	<span>⌚ Unknown</span>	<div style="width: 63%;">63%   Unknown</div>	Run bot	15:01:04 IST 2018-02-20	Loops.atmx	PRODUCTLT3	--
<input type="checkbox"/>	<span>⌚ Waiting for user input</span>	<div style="width: 61%;">61%   Waiting for user input</div>	Run bot	11:38:58 IST 2018-02-20	Prompt.atmx	PRODUCTLT4	--
<input type="checkbox"/>	<span>⌚ Active</span>	<div style="width: 50%;">50%   Active</div>	Run bot	11:35:58 IST 2018-02-20	Prompt.atmx	PRODUCTLT2	--
<input type="checkbox"/>	<span>⌚ Paused</span>	<div style="width: 64%;">64%   Paused</div>	Run bot	11:33:09 IST 2018-02-20	Files-Folders.atmx	PRODUCTLT1	--

## In progress details

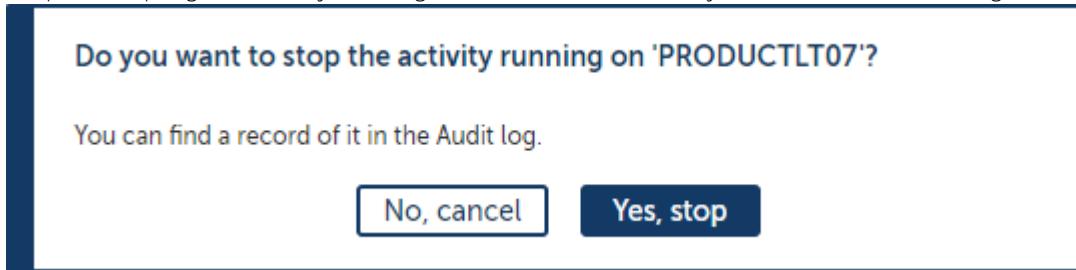
To view in progress activity details,

1. Go to Activity > In Progress
2. Mouse over an activity
3. Click 
4. The following page is launched:



Here, you can choose to Pause, Play, Stop or Move the activity to historical activity page.

1. Click  to run a bot that is Paused
2. Click  to interrupt a bot that is Active (In progress):
3. Stop the in progress bot by clicking  in which case you are shown a message for confirmation:



- a) Click Yes, stop to return to the In progress page.
- b) Click No, Cancel to return to the View activity in progress details page.
4. Click  to remove the activity that is in Unknown status from the In progress activity page to Historical activity page

Note: You cannot Pause/Resume or Stop an automation that has queues from the View activity in progress page. You can do that from the Workload Queues page by using the View Automation option. Refer [Manage Work Items](#).

The different areas of the View in progress activity page are described in the following table.

Area	Description
BOT + DEPENDENCIES	The name of the bot and dependencies for the scheduled bot.
DEVICES	The name of the device connected to the bot.
NAME + DESCRIPTION	The name and description for the activity. By default, this displays the Bot name, date, time, and name of the person who ran the bot.
RUN DETAILS	<p>The run details for the bot which include:</p> <ul style="list-style-type: none"> <li>Progress - The bot progress in percentage</li> <li>Status - Active, Paused, Unknown or Waiting for user input</li> <li>Started on - The date and time when the bot was executed</li> <li>Line + Command - The current line number and command name of that line</li> </ul> <p>Note: <a href="#">11.3.3</a> The details of the command is not displayed for the protected bots that are downloaded from the Bot Store.</p>
GENERAL DETAILS	<p>The details for the bot execution which include:</p> <ul style="list-style-type: none"> <li>Last modified - The last date and time the bot was modified.</li> <li>Modified by - The name of the user who last made changes to the bot.</li> <li>Object type - The type of object of the bot, such as Run Bot.</li> </ul>

## Audit Details

The Audit log page shows the In progress activities when you use the Run bot now... option.

Related concepts

[Audit log overview](#)

[Manage Work Items](#)

## Manage historical activity

The Historical activity page captures and chronologically lists the automations that have occurred.

This page lists all the activities, which have finished running - successfully or unsuccessfully. For example, there may be scenarios where an activity failed to run and you can use this page to come back and check the status of such an activity.

Remember: The information is captured in the Historical activity page only if the bot is uploaded by the Bot Creator to the Enterprise Control Room repository.

To view this page, you should have the View my in-progress activity or View everyone's in-progress activity permission.

- If you have the View my in-progress activity permission, you should be able to see all the completed automations that you deployed or scheduled.
- If you have the View everyone's in-progress activity, you should be able to see all the automations run or scheduled by other users.
- Note: You must have the Run/Schedule permission on the corresponding bot to be able to see the activity here.

See [Create a Role](#)

You can use this page to run the 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.

For ease of access, you can apply search parameters to the Status, Device Name, Automation Name, User, and Bot Name columns in the search bar.

Note: When you specify search parameters for the same column, the system searches using the OR operator. When you specify search parameters for different columns, the system searches using the AND operator.

Perform the following actions on a column for efficiency:

- 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 or 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 on the data that is currently visible to you. The last sorting is stored in the 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 it to resize it.

The items of the Activity table are described in the following table.

Item	Description
Status	The status of the activity. This may be Unknown, Completed, Failed, Stopped, or Time Out.
Device name	The name of the Bot runner machine on which the automation was running.
Automation name	The name of the automation.
Bot name	The name of the bot.
User	The name of the user under whose account that particular activity/automation was running on the device.
Started on	The date and time on which the activity was started.
Ended on	The date and time on which the activity was completed.

You can do the following tasks on an individual item in the Historical activity page.

Action	Description
View	Enables you to view details of the activity.

Action	Description
Run bot	<p>Enables you to run the selected Bot.</p> <p>Tip: Move your mouse over the Actions icon and click the Run icon to run the activity again.</p> <p>Clicking the Run icon opens the Run bot now page with all the values of the bot populated. You can then make changes to the bot and run the bot again.</p>
<p>Note: <b>11.3.3</b> When a bot is run locally on an Unattended or Attended Bot Runner and/or Bot Creator machine, the View and Run bot actions are not available for that particular activity.</p>	

You can also do the following actions for a set of multiple activities. These actions can be done only at the table-level and not on individual items.

Table Item	Description
Refresh	Refreshes the table.
Export to CSV	Exports the selected items in the table in CSV format.
Customize columns	Select the columns to show in the table.

Related tasks

[Create a Role](#)

[Run a Bot](#)

Related reference

[View details of selected activity from history](#)

## View details of selected activity from history

As a user with access privileges to the Historical activity, when you click the View icon  for an activity, the View historical activity page is opened.

This page provides information in three sections - Details of activity such as Bot + Dependencies, Device, Name + Description of activity, Run details, and General details. Besides this, you can also run the bot again from this page.

The page shows details based on the activity type,

- The Run bot activity page is illustrated below:
- The Schedule a bot activity page is illustrated below:

The different sections of the Historical activity view details page are described in the following table.

Area	Description
Bot + Dependencies	Displays the Bot name and name of its dependent bots or files.
Device	Displays the device name of the source Enterprise Control Room from which the Bot was deployed
Run Details	<ul style="list-style-type: none"> <li>Progress: Displays color coded progress in automation, <ul style="list-style-type: none"> <li>Red - when automation fails or is stopped with error message</li> <li>Green - when automation is completed</li> </ul> </li> <li>Percentage of automation completed, stopped or failed</li> </ul>
Schedule Details	<p>This tab is visible only if the bot is deployed using Schedule a bot operation.</p> <ul style="list-style-type: none"> <li>Schedule type: Displays the type of schedule used to deploy the bot. For example, Run once.</li> <li>Next occurrence: Displays the next schedule run date + time</li> <li>Start/End date: Displays the schedule start and end date + time</li> </ul>
General details	<p>Displays following details,</p> <ul style="list-style-type: none"> <li>Last Modified: Displays the last time changes were made to the folder in date and time.</li> <li>Modified by: Displays the name of the user who last made changes to the folder in date and time.</li> <li>Object type: Displays the activity type - Run Bot or Schedule Bot</li> </ul>

#### Related tasks

[Run a Bot](#)

## Schedule a bot

There are times when you want to run a bot at a later point in time, or when you want the bot to run on a periodic basis, or at a specific point in time. In such cases, use the Schedule bot page to do such tasks.

## Prerequisites

You can schedule a bot from any of the following pages of Enterprise Control Room if you have the View everyone's In progress activity, View my scheduled bots, and View my bots privileges:

- Activity > In progress
- Activity > Scheduled
- Bots > My bots

- Devices > Bot runners and bot creators

To schedule a bot, do the following:

## Procedure

1. Click the Schedule bot... link on the appropriate page, such as In progress, Scheduled, My bots, or Bot runners and bot creators page. The Schedule bot page appears.
2. From the Select a TaskBot area, click one of the folders depending on your requirements. The Type and name of the available bots are shown on the right hand side in a tabular format.

Note:

- You can access only those folders for which you have the Run+Schedule permission.
- You cannot schedule Attended Bots from the Enterprise Control Room. Only Unattended Bots are available for the Schedule operation.

3. Click a bot to select a TaskBot depending on your requirements.  
The Select button is enabled.
4. When you click the Select button, the bot is ready to be scheduled. You can view the dependencies of the selected bot in the Review dependencies for <bot name> section.  
Note: When you click the Select button, the label of the button changes to Replace. This gives you an option of selecting another bot and replacing the selected bot.
5. Click the Select button. The bot and all its dependencies are added to the Review dependencies for <bot name> section.

Although, you will be able to schedule a bot, automation fails in the following cases:

- If any of the bot dependencies are missing
  - If you do not have the folder privileges on the dependencies
  - If you do not have the Run+Schedule permission (the one that shows a red dependency icon - )
6. Click the Next link. The SCHEDULE + DEVICES tab appears.

You have two options of scheduling a bot – Run once and Run repeatedly.

- Run once: Use this option to run the bot once on a given day at X hour. When you select this option, you must set the Start date and Start time.
- Run repeatedly: Use this option when you want to schedule your bot to run every X minutes per hours on a given day. When you select this option, you must select the Start date, End date, and Start time.
  - Enter the Start date either manually in MM/DD/YYYY format or by using the pop-up calendar. The default value of the Start date field is set to the current day of your local system.  
Enter the End date if you are using the Run repeatedly option. The default value of the End date field is blank.  
Note: If the value selected in the Start date field is the current day, the scheduled time must be greater than the current time. Also, the value of the End date field must be later than or equal to the value in the Start date field.
  - **11.3.3** Enter the Start time using the drop-down list to quickly set the time value. The list contains pre-defined time values in the 12-hour format at intervals of 15 minutes. You can also manually set the time value in the 12-hour format. However, this is not available for the selection in the drop-down list. The default value of the Start Time field is rounded off to the

closest half-hour that is 15 minutes away. For example, if the current time is 11:22 AM, it will display 12:00 PM.

- Time Zone: While creating and editing a schedule, you can select the Time Zone with the start time. The default value of the Time Zone is set to the current location your system.

Note: A schedule is run based on the Time Zone selected when creating or editing a schedule.

For more information about selection of time in schedules by considering Day Light Saving Time (DST) switch over, see [Day Light Saving and Time Zone Selection in Schedules](#).

7. After selecting the Run once or Run repeatedly options, click a device of your choice from the Available devices area and use the arrow button to move it to the Selected devices area. The list shows the devices connected and disconnected to the Enterprise Control Room.  
Note: You can select only bot runner devices that are connected. If a device is not connected, it is not enabled. Also, if the device does not appear in the list, ensure that an active bot runner session is running on the device.
8. Optionally, select the Run bot runner session on control room to [view the progress](#) of the bot run in the Activity > In Progress page.  
Note: On selecting this option, a separate [Audit logs for run bot deployment and bot runner session](#) is logged in the Enterprise Control Room.
9. After the device is added to the list of selected devices, the Upcoming schedules for that device are shown. This helps to decide whether to deploy another schedule or not.
10. Click the Next link.  
The NAME+DESCRIPTION tab appears.
11. Enter a name and description in the General area and click the Schedule bot button. The bot is added to the Activity table of the Scheduled activity page.  
Note: The Schedule bot button remains disabled until all the required items, such as bots, schedule details, and devices are not selected.

## Day Light Saving and Time Zone Selection in Schedules

Day Light Saving Time (DST) switchover and selection of Time Zone in Schedules.

When the Day Light Saving Time (DST) switchover occurs, the clock is set forward or backward during this time interval. When DST starts, the time is set forward from 2 a.m. to 3 a.m. When DST ends, the clock is set back by 1 hour between 2 a.m. and 1 a.m. If your schedules are set to trigger during this time interval, then check and ensure whether your schedules are run as expected when the DST switchover occurs.

Note:

- All the application servers must be in the same time zone in the distributed mode for the Enterprise Control Room login to work.
- If you have existing schedules, we recommend that you edit the time in the schedule to ensure that the schedule does not fall in between DST switchover time.
- If you create schedules during the DST switchover, they are automatically created an hour later.

For other default schedule behavior, see table.

11.3.2

## Schedule behavior during DST switchover

The table describes the default schedule behavior when bots are scheduled during DST switchover

Table 1.

Schedule type	Schedule behavior
Run once	The schedule will run only once. For example, if a schedule is set to run on the Day Light Savings day and falls in the switchover time say 2:30, it will run at 3:30 Only.
Run repeatedly > Monthly	The schedule will be skipped. For example, if a schedule is set to run on the Day Light Saving day and falls in the switch over time, it will not run at all. In this case, it is recommended that you either pre pone or post pone the schedule time.
Run repeatedly > Weekly	<p>The schedule will be either pushed by an hour or skipped based on the schedule day and time. For example:</p> <ul style="list-style-type: none"> <li>If the first instance of the weekly schedule is set to run on the Day Light Saving day and falls in the switch over time, it will be pushed by an hour. Note: Here first instance refers to the first day of the Start date</li> <li>However, if the subsequent instance of the weekly schedule is set to run on the Day Light Saving day and falls in the switch over time, it will be skipped.</li> </ul>
Run repeatedly > Repeats Daily > Repeat every n hour or minute	<p>The schedule will be either pushed by an hour or skipped based on the schedule day and time. For example:</p> <ul style="list-style-type: none"> <li>If the first instance of the daily schedule is set to run on the Day Light Saving day and falls in the switch over time, it will be pushed by an hour. Note: Here first instance refers to the first day of the Start date</li> <li>However, if the subsequent instance of the daily schedule is set to run on the Day Light Saving day and falls in the switch over time, it will be skipped.</li> </ul>

## Manage scheduled activity

View and manage activities that are scheduled from the Scheduled Activity page. Access the Scheduled activity page by logging on to Enterprise Control Room and clicking Activity > Scheduled

## Permissions required

View my scheduled bots, and View my bots privileges to do tasks, such as edit, view, activate, deactivate, or delete the schedule.

## Manage scheduled activities

Use the Scheduled Activity page to:

Monitor the following in the Activity table:

- The schedule Type. For example, One time or Recurring.
- Next occurrence of the scheduled bot to run.
- Activity name. For example, List files in a folder, loops.
- Bot name. For example, monthly-payroll.atmx.
- Schedule description. For example, every Monday at 3 PM.
- Devices on which the bot will run at the scheduled time.
- Status of the scheduled activity. For example, active or inactive.
- The name of the user who last modified the activity in Modified by.
- The date and time when the activity was Last modified.

Tip: For ease of access, you can search by Activity name in the search bar given above the table.

Perform the following tasks on an individual schedule by moving your mouse over the Actions icon.

- Edit the scheduled bot
- View details of the scheduled bot
- Activate or Deactivate the scheduled bot
- Delete the scheduled bot

Perform the following table-level actions for a set of multiple activities. These actions can be performed only at a table-level and not on individual items.

- Refresh the Schedules page.
- Activate or Deactivate the schedules.
- Delete the schedules.
- Export the selected schedules to a csv file.
- Select the columns to show or hide in the Activity table by using Customize columns.

Related tasks

[Edit scheduled activity](#)

Related reference

[View scheduled bot details](#)

[Delete a schedule](#)

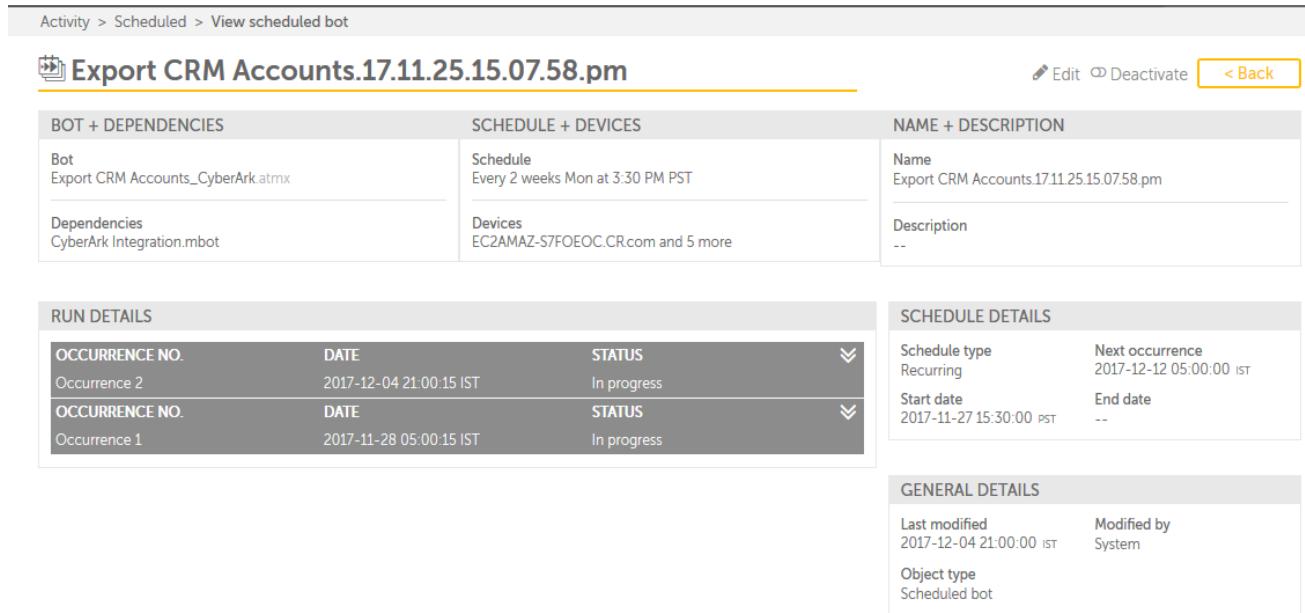
[Activate or deactivate a scheduled activity](#)

## View scheduled bot details

After you have scheduled a bot, you can view details for the bot from the View scheduled bot page.

This page allows you to make changes to the bot using the Edit button  and activate or deactivate it depending on your requirements by using the activate/deactivate toggle button .

This page illustrated in the following figure.



BOT + DEPENDENCIES		SCHEDULE + DEVICES	NAME + DESCRIPTION
Bot Export CRM Accounts_CyberArk.atmx		Schedule Every 2 weeks Mon at 3:30 PM PST	Name Export CRM Accounts.17.11.25.15.07.58.pm
Dependencies CyberArk Integration.mbot		Devices EC2AMAZ-S7FOEOC.CR.com and 5 more	Description --

RUN DETAILS			SCHEDULE DETAILS
OCCURRENCE NO. Occurrence 2	DATE 2017-12-04 21:00:15 IST	STATUS In progress	Schedule type Recurring
OCCURRENCE NO. Occurrence 1	DATE 2017-11-28 05:00:15 IST	STATUS In progress	Next occurrence 2017-12-12 05:00:00 IST
			Start date 2017-11-27 15:30:00 PST
			End date --

GENERAL DETAILS	
Last modified 2017-12-04 21:00:00 IST	Modified by System
Object type Scheduled bot	

The different areas of the View scheduled bot page are described in the following table.

Area	Description
BOT + DEPENDENCIES	The name of the bot and dependencies for the scheduled bot.
SCHEDULE + DEVICES	The date and time at which the bot has been scheduled along with the name of the device connected to the bot.
NAME + DESCRIPTION	The name and description for the bot.
RUN DETAILS	The run details for the bot. For example, when did the bot last run?
SCHEDULED DETAILS	<p>The following details for the schedule are displayed here.</p> <ul style="list-style-type: none"> <li>• Schedule type: Whether the schedule will run once or repeatedly?</li> <li>• Next occurrence: When the schedule will run again</li> <li>• Start date: The date when the schedule will run for the first time.</li> <li>• End date: The date when the schedule will stop running.</li> </ul>
GENERAL DETAILS	<p>The following details for the schedule are displayed here.</p> <ul style="list-style-type: none"> <li>• Last modified: The last date and time the bot was modified.</li> <li>• Object type: The type of object of the bot, such as scheduled bot.</li> </ul>

	<ul style="list-style-type: none"><li>Modified by: The name of the user who last made changes to the scheduled bot.</li></ul>
--	---

## Edit scheduled activity

There may be times when you want to make certain changes to the schedule so that the automation is not skipped.

### Prerequisites

You may want to edit the scheduled activity to:

- change the schedule type, date, or time.
- add or remove Bot Runners from the schedule.
- change the retry settings.

To edit a scheduled activity, perform the following steps.

### Procedure

- On the Scheduled activity page, move your mouse over the Actions icon  of an item in the Activity table and click the Edit icon .
- The Edit scheduled bot page is displayed.
- Make changes to the bot depending on your requirements and click Schedule bot.
- Note: You must select the fields, such as bots and devices. These are required to save your changes.

## Delete a schedule

If you have Delete my bots privileges, you can delete a scheduled activity.

To delete a scheduled activity, perform the following steps.

- On the Scheduled activity page, move your mouse over the Actions icon  of an item in the Activity table and click the Delete icon .
- When you click the Delete icon , a delete confirmation message is displayed.
- Click Yes, delete to delete the scheduled activity.

## Activate or deactivate a scheduled activity

As a Enterprise Control Room user with Manage and Update all schedules privileges, you can activate or deactivate scheduled activities individually or in bulk.

For example, you can choose to activate schedules that are inactive when you want to run the automation in bulk. Or you can deactivate multiple schedules during down time.

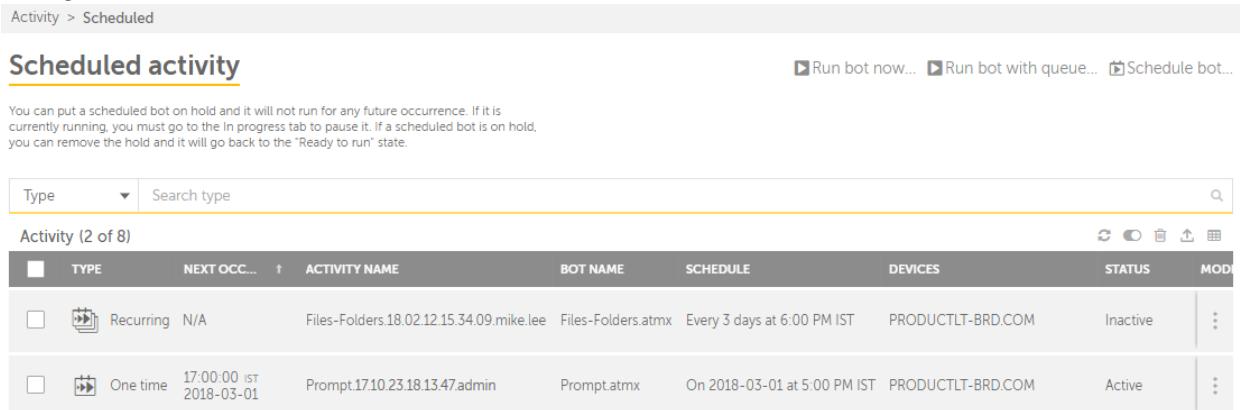
By default, all schedules on this page are in activated state.

## Deactivate Schedule(s)

You can deactivate a single or multiple schedules based on your requirement.

To deactivate a schedule,

1. Go to Activity > Scheduled
2. The Scheduled activity page is launched.
3. In the Activity area mouse over  for the Schedule that you want to deactivate. For example, the Recurring type schedule for Files-Folders.atmx
4. Click 
5. The schedule is deactivated. The status in the Next Occurrence column is displayed as NA and Status changes to Inactive:



Type	Activity Name	Bot Name	Schedule	Devices	Status	Mod	
 Recurring	Files-Folders.18.02.12.15.34.09.mike.lee	Files-Folders.atmx	Every 3 days at 6:00 PM IST	PRODUCTLT-BRD.COM	Inactive		
 One time	17.00:00 IST 2018-03-01	Prompt.17.10.23.18.13.47.admin	Prompt.atmx	On 2018-03-01 at 5:00 PM IST	PRODUCTLT-BRD.COM	Active	

Similarly, you can deactivate multiple schedules by clicking  that is given above the Activity table.

## Activate Schedule(s)

You can activate a single or multiple schedules based on your requirement.

1. Go to Activity > Scheduled
2. The Scheduled activity page is launched.
3. In the Activity area mouse over  for the Schedule that you want to activate. For example, the Recurring type schedule for Files-Folders.atmx
4. Click 
5. The schedule is activated. The status in the Next Occurrence column is displayed in date & time format and Status changes to Active.

Similarly, you can activate multiple schedules by clicking  that is given above the Activity table.

The Deactivate -  or Activate -  button above the table appears based on the greater number of schedule status.

- When the number of schedules with Active status are more than the Inactive ones,  is shown.

- When the number of schedules with Inactive status are more than the Active ones,  is shown.

## Devices overview

A device is an Automation Anywhere Enterprise client machine that connects you to the Enterprise Control Room to create or run bots.

Users connected to the Enterprise Control Room as a Bot Creator or a Bot Runner can be managed from the Enterprise Control Room.

### What are My Devices and why use them?

My Devices is a list of devices registered and connected to your current Enterprise Control Room instance.

Use My devices with the manage devices privileges to view and manage the registered devices and identify the devices' status (connected or disconnected) from the Enterprise Control Room instance. See [Manage Devices](#).

### What are Device Pools and why use them?

Device pools are a logical grouping of similar Bot Runners on which you can run bots with the work item from a queue. For example, you can group devices of a specific department or unit and create a device pool for it.

Use My Device Pool to create and view a list of device pools that are available from the current Enterprise Control Room instance. A Device Pool admin can view all the devices that can be used for work items in workload management. You can also create device pools comprising Bot Runners. See [Manage device pools](#).

- [Manage Devices](#)

As an Enterprise Control Room admin or a user with manage devices privileges, you can view the devices that are registered to your Enterprise Control Room instance.

- [Manage device pools](#)

A device pool is a logical grouping of similar type of devices on which bots are run as work items from their respective queues. For example, you can group devices of a particular department/unit and create a device pool for it.

## Manage Devices

As an Enterprise Control Room admin or a user with manage devices privileges, you can view the devices that are registered to your Enterprise Control Room instance.

Device privileges include viewing and managing [Bot Runners](#), [Bot Creators](#), and creating and managing device pools.

Only an admin user has access to see all the devices (Bot Runners and Bot Creators) in the Enterprise Control Room. A non-admin user will not have access to view the Bot Creators.

## View device details

You can view the following details of the device:

- Status – View the combined status of the user and the device used by that user. The Connected and Disconnected statuses indicate whether the bot is logged in or logged out of the Enterprise Control Room respectively. An Offline status indicates that the device user is unregistered or disabled by the Enterprise Control Room admin.
- Device name – View the device's fully qualified server name.
- Username – View the name of the user connected with the device.
- Device pool – View the device pool name that the device is a part of. N/A indicates that the device cannot be a part of any device pool and “- -” indicates that the device is not a part of any device pool. See [Manage device pools](#).
- Type – View the type of license assigned by the Enterprise Control Room admin.

## How to manage devices with a task

You can perform a task on an individual device or on multiple devices by selecting the required devices from the table. Do the following tasks to manage the devices:

- Run bot – Run one or more bots for the production deployment with the Run my Bots privileges. See [Run a Bot](#).
- Schedule bot – Schedule one or more bots to run on a periodic basis or at a specific point of time. See [Schedule a bot](#).

You can also perform the following actions on the selected devices:

- Export data to a CSV file based on month, filters, or selection to save the data for future analysis.
- Refresh table to view the latest device status.
- Customize columns to show or hide specific columns. By default, all the columns are shown.

## How to work efficiently with device entries

You can perform the following actions on a column in the My Devices table to help you work efficiently:

- Click a column to sort it in an ascending or descending order. You can sort up to three columns by pressing the Shift key when you click two more columns. This gives you the option of sorting two additional columns. In this way, the sorting is done on the entire table and not just on the data that is currently visible to you. The last sorting applied by the user is saved for that session.
- Drag and drop to move the column to the left or right.
- Move your mouse cursor at the end of the column and drag it to resize the column.

- [Run a Bot](#)

The bots must be checked into a Control Room repository so that they are available for production deployment. Users with Run my Bots privileges may then deploy and execute the bots from the In progress, Scheduled, or My Bots page.

- [Schedule a bot](#)

There are times when you want to run a bot at a later point in time, or when you want the bot to run on a periodic basis, or at a specific point in time. In such cases, use the Schedule bot page to do such tasks.

Related concepts

[Roles Overview](#)[Related tasks](#)[Schedule a bot](#)[Run a Bot](#)

## Run a Bot

The bots must be checked into a Control Room repository so that they are available for production deployment. Users with Run my Bots privileges may then deploy and execute the bots from the In progress, Scheduled, or My Bots page.

### Prerequisites

- Ensure you have Run my bots privilege.
- Ensure a client with Bot Runner license is connected to the Enterprise Control Room.

### Procedure

1. Login to Enterprise Control Room.
2. Click Bots > My bots.  
My bots page that has only the bots created by users with Unattended Bot Runner license is displayed.  
Note: You cannot run bots created by users with attended Bot Runners license.
3. Click Run bot > Run bot now.  
Run bot now page is displayed.
4. Under Select a TaskBot tab, select a folder that contains bots.

The TYPE and NAME of the bot are displayed.

Note: You can only access the folders for which you have Run+Schedule privileges.

5. Select a TaskBot.

6. Click the  icon.

The bot is added to the Review dependencies for Files-Folders section.

Note: When you run a bot, automation can fail if:

- Any of the bot dependencies are missing.
- You do not have folder privileges for the dependencies.
- You do not have Run+Schedule privileges ( icon appears).

7. Click Next.

Available devices and bot runners in the Enterprise Control Room are displayed.

8. (Optional) Select Run Bot Runner Session on Control Room.

This allows the Enterprise Control Room to take Remote Desktop Protocol (RDP) of the Bot Runner machine to run a scheduled task, if it is in locked or logged off state. This method is recommended when Bots are deployed on virtual machines and terminal servers. See [RDP based approach to bot deployment - Guidelines](#).

9. Select any bot under the Available bot runners section, and click the  icon.

Note: You can only select a connected Bot Runner devices, as disconnected devices are not enabled.  
Also, if a device is not displayed, ensure the device has an active Bot Runner session.

10. Click Next.

11. (Optional) Under the General tab, update the Name and Description.

By default, a name is available for automation in the [bot name].[DD.MM.YY][HH.MM.SS].[USERNAME] format, which you may change as per your preference.

12. Click Run Now.

The selected bot is initiated and you can view the progress under the In Progress activity page.

Note: Run now is disabled if the device is disconnected or the required fields are not filled.

- [RDP based approach to bot deployment - Guidelines](#)

When you deploy a bot from the Enterprise Control Room to any Bot Runner, it attempts an auto-login (if the Bot Runner is locked or logged off). However, auto-login is prone to security policies set on the machine. Therefore, certain policies may have to be relaxed for the auto-login function. To reduce these issues, you can use Remote Desktop Protocol (RDP) based bot deployment that is introduced in Enterprise Control Room from AAE 10SP2.

Related reference

[RDP based approach to bot deployment - Guidelines](#)

## Schedule a bot

There are times when you want to run a bot at a later point in time, or when you want the bot to run on a periodic basis, or at a specific point in time. In such cases, use the Schedule bot page to do such tasks.

## Prerequisites

You can schedule a bot from any of the following pages of Enterprise Control Room if you have the View everyone's In progress activity, View my scheduled bots, and View my bots privileges:

- Activity > In progress
- Activity > Scheduled
- Bots > My bots
- Devices > Bot runners and bot creators

To schedule a bot, do the following:

## Procedure

1. Click the Schedule bot... link on the appropriate page, such as In progress, Scheduled, My bots, or Bot runners and bot creators page. The Schedule bot page appears.
2. From the Select a TaskBot area, click one of the folders depending on your requirements. The Type and name of the available bots are shown on the right hand side in a tabular format.  
Note:
  - You can access only those folders for which you have the Run+Schedule permission.
  - You cannot schedule Attended Bots from the Enterprise Control Room. Only Unattended Bots are available for the Schedule operation.
3. Click a bot to select a TaskBot depending on your requirements.  
The Select button is enabled.
4. When you click the Select button, the bot is ready to be scheduled. You can view the dependencies of the selected bot in the Review dependencies for <bot name> section.

Note: When you click the Select button, the label of the button changes to Replace. This gives you an option of selecting another bot and replacing the selected bot.

5. Click the Select button. The bot and all its dependencies are added to the Review dependencies for <bot name> section.

Although, you will be able to schedule a bot, automation fails in the following cases:

- If any of the bot dependencies are missing
- If you do not have the folder privileges on the dependencies
- If you do not have the Run+Schedule permission (the one that shows a red dependency icon - 

6. Click the Next link. The SCHEDULE + DEVICES tab appears.

You have two options of scheduling a bot – Run once and Run repeatedly.

- Run once: Use this option to run the bot once on a given day at X hour. When you select this option, you must set the Start date and Start time.
- Run repeatedly: Use this option when you want to schedule your bot to run every X minutes per hours on a given day. When you select this option, you must select the Start date, End date, and Start time.

- Enter the Start date either manually in MM/DD/YYYY format or by using the pop-up calendar. The default value of the Start date field is set to the current day of your local system.

Enter the End date if you are using the Run repeatedly option. The default value of the End date field is blank.

Note: If the value selected in the Start date field is the current day, the scheduled time must be greater than the current time. Also, the value of the End date field must be later than or equal to the value in the Start date field.

- **11.3.3** Enter the Start time using the drop-down list to quickly set the time value. The list contains pre-defined time values in the 12-hour format at intervals of 15 minutes. You can also manually set the time value in the 12-hour format. However, this is not available for the selection in the drop-down list. The default value of the Start Time field is rounded off to the closest half-hour that is 15 minutes away. For example, if the current time is 11:22 AM, it will display 12:00 PM.

- Time Zone: While creating and editing a schedule, you can select the Time Zone with the start time. The default value of the Time Zone is set to the current location your system.

Note: A schedule is run based on the Time Zone selected when creating or editing a schedule.

For more information about selection of time in schedules by considering Day Light Saving Time (DST) switch over, see [Day Light Saving and Time Zone Selection in Schedules](#).

7. After selecting the Run once or Run repeatedly options, click a device of your choice from the Available devices area and use the arrow button to move it to the Selected devices area. The list shows the devices connected and disconnected to the Enterprise Control Room.

Note: You can select only bot runner devices that are connected. If a device is not connected, it is not enabled. Also, if the device does not appear in the list, ensure that an active bot runner session is running on the device.

8. Optionally, select the Run bot runner session on control room to [view the progress](#) of the bot run in the Activity > In Progress page.

Note: On selecting this option, a separate [Audit logs for run bot deployment and bot runner session](#) is logged in the Enterprise Control Room.

9. After the device is added to the list of selected devices, the Upcoming schedules for that device are shown. This helps to decide whether to deploy another schedule or not.
10. Click the Next link.  
The NAME+DESCRIPTION tab appears.
11. Enter a name and description in the General area and click the Schedule bot button. The bot is added to the Activity table of the Scheduled activity page.  
Note: The Schedule bot button remains disabled until all the required items, such as bots, schedule details, and devices are not selected.

## Manage device pools

A device pool is a logical grouping of similar type of devices on which bots are run as work items from their respective queues. For example, you can group devices of a particular department/unit and create a device pool for it.

### Introduction

You can manage all device pools that can be used for work items in [Workload Management](#) if you are a device Pool Admin. You can view only those device pools for which you have device Pool Owner and/or Pool Consumer privileges.

The device pool owner privilege allows you to create device pools comprising Bot Runners.

The My device pools page is illustrated in the following figure:

Status	Device Pool Name	Detailed Status	# of Automations	# of Devices	Owners
<input type="checkbox"/> Disconnected	Finance	All disconnected	0	1	Mike Lee
<input type="checkbox"/> Connected	Payroll Automations	All connected	0	1	Amy.Chen and 1 more

Note: You need to create device pools to view those in the list. To get started, click the create a device pool here link.

For ease of access, you can search by device pool name.

The following describes the list of items that can be viewed in the table:

Table Item	Description
 Status	<p>Shows device's status. Here, status refers to the status of both User and Device from which the user is connects.</p> <ul style="list-style-type: none"> <li>Connected when the user and device are connected to the Control Room from selected Bot Runner</li> <li>Disconnected when the user and device are not connected to the Enterprise Control Room from selected Bot Runner</li> <li>Offline when the user is deactivated by the Enterprise Control Room admin</li> </ul>
Device Pool Name	Shows name of the device pool
Detailed Status	<p>Shows status of the devices that are part of that particular device pool</p> <ul style="list-style-type: none"> <li>All Connected when all users and devices are connected to the Enterprise Control Room</li> <li>All Disconnected when one or more user and device are disconnected from the Enterprise Control Room</li> </ul>
# of Automations	Shows the number of automation that are currently deployed on that particular device pool
# of Devices	Shows the number of devices that are included in the device pool
Owners	Shows the owner name(s) of the device pool

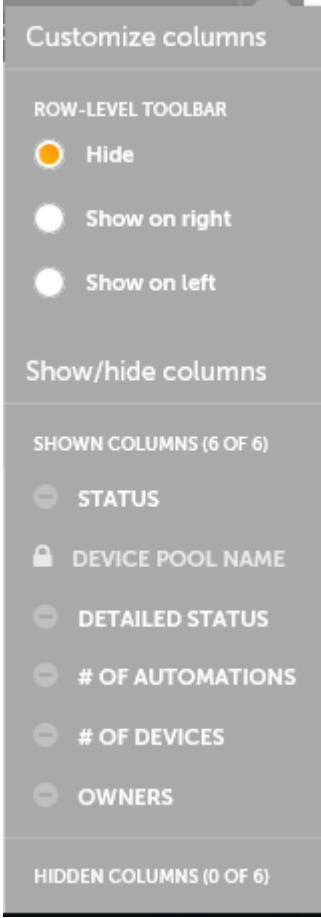
You can do the following actions on a table column:

- 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.
- 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 re-size

The following describes the tasks that you can do on an individual device pool:

Table Item	Description
 Run	Allows you to run a Bot on the device pool immediately
 View	Allows you to <a href="#">Create device pools</a>
 Edit	Allows you to <a href="#">Edit device pool</a>
 Delete	Allows you to <a href="#">Deleting device pools</a>

Alternatively, you can select all device pools and do the following actions. Note that these actions can be done only at a table level and not on individual items.

Table Item	Description
 Delete	Allows you to delete one or more device pools
 Customize column	<p>Allows you to show or hide columns other than Device Pool Name:</p>  <p>The dialog box has sections for 'ROW-LEVEL TOOLBAR' (with 'Hide' selected), 'Show/hide columns' (listing columns like STATUS, DEVICE POOL NAME, DETAILED STATUS, # OF AUTOMATIONS, # OF DEVICES, OWNERS), and 'HIDDEN COLUMNS (0 OF 6)'.</p>

When you want to do actions such as Run bot with queue or Create a device pool quickly without switching your current location, you can use the following options:

Table Item	Description
 Run bot with queue...	Allows you to <a href="#">run bot with a queue</a> for workload management
 Create device pool.	Allows you to <a href="#">Create device pools</a> for workload management

## Audit Log

All the Create, Update, Delete actions are tracked in audit log for record keeping and future use. You can refer those entries in the Audit Log page.

To view details of the audit entry, click  which is visible when you mouse over .

- [Create device pools](#)

Create a device pool with a unique name and add Unattended Bot Runners to the device pool. To create device pools, an Enterprise Control Room administrator grants the Create device pools feature permission and assigns the AAE\_Pool Admin role.

- [View device pool](#)

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 workload requirement.

- [Edit device pool](#)

As a Enterprise Control Room user with device pool management privileges or as a device pool owner, you can edit device pool details to customize as per your workload requirement.

- [Deleting device pools](#)

You can delete a device pool comprising of unattended Bot Runners after your entity's SLAs are achieved and the device pools are no longer required.

Related tasks

[Edit device pool](#)

[Deleting device pools](#)

Related reference

[View device pool](#)

### Create device pools

Create a device pool with a unique name and add Unattended Bot Runners to the device pool. To create device pools, an Enterprise Control Room administrator grants the Create device pools feature permission and assigns the AAE\_Pool Admin role.

You can add only those Unattended Bot Runners that are not a part of any pool and are not associated with any role. Optionally, you can add other users as owners so that they can manage the pool. You can also add Enterprise Control Room user roles as consumers. Only users with these roles can use the pool for any automation.

You cannot create a device pool comprising of Attended Bot Runners.

To create a device pool, do the following:

### Procedure

1. Click Devices.
2. Click Create device pool on the top right of the Devices 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, Last name, or Email.

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 Create Device Pool to complete the device pool creation process.

8. 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 pr 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.

9. Click Create Device Pool.

The device pools for which you have consumer privileges are listed in the My Device Pools page.

## Next steps

[Create queues](#)

[Related concepts](#)

[Run bot with queue](#)

## View device pool

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 workload requirement.

To view device pool details,

1. Go to Devices > My Device Pools
2. For the device pool that you need to view, mouse over the actions icon - 
3. Click .

The Device Pool Details page is launched in view mode. The page provides details of the device pool in two sections:

- Device Pool Details such as the Name, Description, Status, and Detailed Status

- Device Pool contents in tabs such as Automations, Unattended Bot Runners, Device Pool Owners, and Device Pool Consumers.

Select each tab to view its details.

The following provides details for each of the following tabs:

- 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 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.
- 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 re-size
- Bot Runners - Shows list of Unattended Bots that are part of the device pool.
- Device Pool Owners - Shows list of Device Pool Owners that are granted permission to view, edit, and delete the device pool. See [Create device pools](#) for details.
- Device Pool Consumers - Shows the list of Device Pool Consumers who are granted permission to view the device pool as an option while running automations. See [Create device pools](#) for details.
- 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.

When you view a device pool, apart from updating the Bot Runner, Device Pool Owner, and Consumer details, you can additionally choose to:

- [Run Bot with queue](#)
- [Edit device pool](#)
- [Create device pools](#)

## Edit device pool

As a Enterprise Control Room user with device pool management privileges or as a device pool owner, you can edit device pool details to customize as per your workload requirement.

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. This is visible only when you edit a device pool and is not available when you create a device pool. Apart from this you can update the Bot Runner, Device Pool Owner, and Consumer details.

To edit a device pool,

## Procedure

1. Go to Devices > My Device Pools.  
Tip: You can also edit device pool details when in view mode. See [View device pool](#) to learn more.
2. For the device pool that needs to be updated, mouse over the actions icon - .

3. Click .

The Device Pool Details page is launched in edit mode.

4. Select the order in which your automations will run.

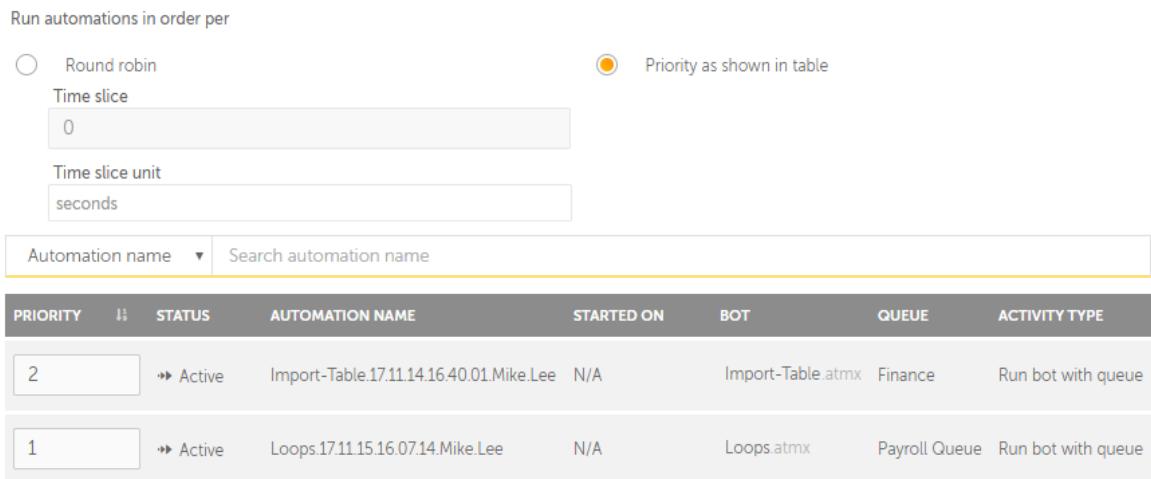
Select either Round robin or Priority as shown in table.

- Round robin - Use this when you want to run your automations at equal time intervals termed as Time slice. A Time slice unit can be defined in seconds, minutes, and hours. You can calculate or estimate the time for each automation and then provide this number.

This means that the automations are executed for only 5 minutes first, then system checks for other automations in queue for execution. If yes, that automation is paused and next automation is executed. This will continue till all automations in the queue are executed.

Note:

- The default Time Slice is set to 5 minutes.
- The Time slice should be more than zero.
- Priority as shown in table - Use this when you want to run your automations on priority defined in the Priority table. This method allows you to run automations in order of priority. Automations are processed till all are consumed from the specified automation queue.



The screenshot shows the configuration for running automations. At the top, there's a section titled "Run automations in order per" with two radio button options: "Round robin" (unchecked) and "Priority as shown in table" (checked). Below this, if "Priority as shown in table" is selected, there are fields for "Time slice" (containing "0") and "Time slice unit" (containing "seconds").

Below the configuration is a table titled "Priority" showing the current state of two automations:

PRIORITY	STATUS	AUTOMATION NAME	STARTED ON	BOT	QUEUE	ACTIVITY TYPE
2	Active	Import-Table.17.11.14.16.40.01.Mike.Lee	N/A	Import-Table.atmx	Finance	Run bot with queue
1	Active	Loops.17.11.15.16.07.14.Mike.Lee	N/A	Loops.atmx	Payroll Queue	Run bot with queue

The following details are shown in the priority table:

Table Item	Description
Priority	<p>Shows the priority number allotted to that queue.</p> <ul style="list-style-type: none"> <li>The Priority column is editable. You can set/re-set automation implementation priority. Ensure that you provide unique priority value to two different work items as same values will 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 automation using this device pool
Activity Type	Shows the Activity type used to run the automation using this device pool - Run bot with queue.

You can perform the following actions on a table column:

- Click a column to sort it in ascending and descending order. You can sort up to three columns by holding the Shift key when you click two more columns. This 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.
  - 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
  - Search on Status, Automation Name, Queue, and Activity Type headers in the table if the data available is large.
5. Update the list of Bot Runners that will be included in the device pool.  
See [Create device pools](#) for details.
  6. Update the list of Device Pool Owners who are granted permission to view, edit, and delete the device pool.  
See [Create device pools](#) for details.
  7. Update the list of Device Pool Consumers who are granted permission to view the device pool as an option while running automations.  
See [Create device pools](#) for details.
  8. Click Save changes.

## Deleting device pools

You can delete a device pool comprising of unattended Bot Runners after your entity's SLAs 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
  1. To delete one device pool, mouse over the actions icon - 
  2. Click .

If the device pool is being used for workload automation, you will not be allowed to delete it.

- Delete multiple or all device pools

1. Select the device pools to delete.

Or

Select all device pools by selecting the Select All check-box in the header.

2. Click  given at the top of the device pools table.

- 
3. Confirm or cancel as required.

Based on your selection, the devices are deleted.

## Workload overview

Use the Workload Management page to divide your automations into small, yet logical work items. Process them simultaneously to ensure that time-based Service Level Agreements (SLAs) are met with optimum resource utilization. Additionally, integrate with a chat application to share the outcome of workload automation with your organization's customers.

### Prerequisite

Before you begin, ensure you have the AAE\_Admin, AAE\_Queue\_Admin, and AAE\_Pool\_Admin privileges to create and manage workload queues, manage workload SLAs, work with workload APIs, and retrieve workload outcome details using your organization's chat application.

For workload automation, do the following:

**Step 1: [Create and manage 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.

**Step 2: [Manage workload SLAs](#)**

Estimate the device pool size or time required to process a given queue size from the Workload Service Level Agreement (SLA) page.

**Step 3: [Add work items using APIs \(optional\)](#)**

Use the Workload Management (WLM) API to add or insert data for work items in an existing queue in your Enterprise Control Room.

**Step 4: [List all work items in a queue \(optional\)](#)**

Automation Anywhere provides a REST API that enables you to retrieve a list of work items in a given queue.

Related tasks

[Create a work item in a queue](#)

[List all work items in a queue](#)

Related reference

[Workload command](#)

**11.3.1.2 [Sample Workload Management properties file](#)**

## Manage 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.

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 manage queues

To create and manage queues, do the following:

**Step 1: [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. To create device pools, an Enterprise Control Room administrator grants the Create device pools feature permission and assigns the AAE\_Pool Admin role.

**Step 2: [Create queues](#)**

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator grants the Create queues feature permission and assigns the AAE\_Queue Admin role.

**Step 3: [Add names of 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 users as queue owners, if required.

**Step 4: [Add names of queue participants \(optional\)](#)**

Add queue participants from different roles defined in the Enterprise Control Room. This is an optional step.

**Step 5: [Add names of queue consumers \(optional\)](#)**

Add queue consumers from different roles defined in the Enterprise Control Room. This is an optional step.

**Step 6: [Define the 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.

**Step 7: [Insert work items using multiple methods](#)**

Add work items from an Excel or CSV file to the queue .

**Step 8: [Run automation using Run bot with queue option](#)**

Collectively process all work items of a queue across all the Bot Runners present in one or more device pools.

## Create queues

Create queues that hold specific sets of data your bot is expecting for automation. To create queues, an Enterprise Control Room administrator grants the Create queues feature permission and assigns the AAE\_Queue Admin role.

## Prerequisites

Create a queue by providing details such as the queue name, queue owners, participants, consumers, and by defining the work item structure.

Tip: A summary of these details is available in the tab on the left side. 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 automations that are designed to manage the payroll system.
- c) Reactivation Threshold: Select the minimum number of new work items with a Ready to Run status required in the queue to resume the queue processing after all the work items in the queue are processed.  
By default, this 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 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 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 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 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.

## 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 Roleslist.
3. Click Next to [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.

## Prerequisites

To consume the work items in the structure, first orchestrate the queue using the Insert Work Item command from the Enterprise client and use the system variable \$Workitem(attribute name). See [Workload command](#).

Define a work item structure using any one of the following methods:

1. Using an Excel/CSV file.
2. Using an existing queue category.
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.

## Procedure

1. Select a method to add header columns for work item processing:

- Excel/CSV file: Add the header columns from an existing Excel or CSV file.
  - a) Enter a unique name for the work item structure in the Queue Category field.

For example, if the queue contains employee information, you can specify the Queue Category 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 five (5) columns are allowed for selection and viewing in the Enterprise Control Room.

**11.3.3** However, if you upgrade to Version 11.3.3, you are allowed to select/view maximum ten (10) columns.

For example, you can select column headers Employee Name, Employee ID, and Designation. You can then select the Data Type - Text, Number, or Date for that column. You can also choose to view these columns being processed in the Activity page.

Note: The system allows you to filter/sort work items on the columns for viewing the work item data in the Enterprise Control Room.

c) Select up to three columns for sorting in an ascending or descending order. When the system processes the work items from the queue, it uses the sort criteria specified to retrieve the work items in that order.

For example, to process payslips with first Employee Id followed by Employee Name from 1 to n and A to Z, specify Employee Id and Employee Name in an ascending order.

- Use queue category: Add header columns by searching for an Existing queue category or a list or from the Available queue categories.  
Tip: Search for an existing queue category when there are a large number of categories available for selection.
- Manually: Define the work item structure manually. You do not have to select from an existing structure.
  - a) Enter a name for the work item structure in the Queue Category field.

For example, if the queue contains employee information, enter the Queue Category 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 .

2. Click Next to [Add work items](#).

## Add work items

Add work items from an Excel or CSV file to the queue .

## Prerequisites

Tip: You can also add work items later by editing the queue. See [Edit queues](#)

## Procedure

1. Click Browse to select an Excel or CSV file.  
The file is added as a work item in the queue.
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

1. Now that you have created a queue, it is now ready for deployment from a bot. See [Run bot with queue](#)
2. Manage work items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors. See [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, the following feature permissions are required:

- Run my bots
- Schedule my bots to run

Use Run a bot with queue from:

1. Activity > Scheduled, Bots > My Bots page
2. Workload > Queues page

The procedure for running a bot with a queue is the same in all these pages.

To process the work items using the Bot Runners, choose the bot to run, select a queue and a device pool, and give it a name with an appropriate description.

To run a bot with queue, do the following:

Step 1: [Add bots and dependent files](#)

Add bots and dependent files to the automation using Run bot with queue.

Step 2: [Select a queue and device pools](#)

Add queues and device pools to the automation using Run bot with queue.

Step 3: [Add name and description \(optional\)](#)

Add a name and description for the automation using Run bot with queue.

Related tasks

[View automation of a queue](#)

Related reference

**11.3.1.2** [Sample Workload Management properties file](#)

Add queues and device pools

Add queues and device pools to the automation using Run bot with queue.

## Prerequisites

You can select only those queues that are not in use and for which you have consumer access privileges. The In use queues appear disabled in the Available queues list.

## Procedure

1. Select a Queue from the Available queues list.  
Tip: Use Search to quickly find the required queue and device pool.
2. Click Add.
3. Select a Device Pool from the Available device pools list.
4. Click Add.  
The queue and device pool are added to the run bot with the queue list.
5. Optional: Select Run bot runner session on Control Room for devices that are in a locked state
6. Optional: Click Remove to replace the queue and/or device.
7. Click Next to [Add name and description](#).

## Add bots and dependencies

Add bots and dependent files to the automation using Run bot with queue.

## Prerequisites

You can run only Unattended Bots. You cannot run Attended Bots from the .

## Procedure

1. Go to Activity > Scheduled, Bots > My Bots, or Workload > Queues page.  
You are taken to the Bots > My bots page.
2. Click Run bot with queue.  
Note: If version control is enabled, you can choose either the latest version or the production version of the Bots.
3. Select a TaskBot to process in the queue from the Folders list.  
By default, the My Tasks folder is selected.  
Tip: Use Search to find a file quickly.
4. Go to the folder that contains the required TaskBot.
5. Click Add.  
If the TaskBot has any dependent files, they are shown in the Bot + Dependencies tab above the file selection.
6. Optional: Review the list of dependent files, if available.
7. Optional: Click Replace to select another bot instead of the selected one.
8. Click Next to [Add queues and device pools](#).

## Add name and description

Add a name and description for the automation using Run bot with queue.

## Prerequisites

The system assigns the automation Name that contains the filename, date, time, and username by default. This is automatically generated and can be changed based on your requirement.

## Procedure

1. Name: Enter a name for the automation.
2. Enter a Description.

Tip: This could describe the purpose of running the bot with a queue.

3. Click Run now.

The status of the queue changes from Not in use to In use in the Queues list on the Queues page.

Note that this queue will not be available for any other automation. This means that only one queue can be used by one bot.

## Next steps

1. Estimate the device pool size or time required to process a given queue size. See [Manage workload SLAs](#).
2. **11.3.1.2** If required, update the wlm.properties file to configure the time interval required to trigger an automation. See [Sample Workload Management properties file](#).

## Workload

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 obsolete queues.

## Workload maintenance tasks

For workload automation maintenance, do the following (in any order):

- [Manage Work Items](#): Manage work items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.
- [View queue details](#): Use the View queues details page to view the details of a particular queue.
- [View automation of a queue](#): Use the View activity in progress page to Pause, Resume, or Stop an in-progress automation.
- [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.

Related concepts

[Manage workload queues](#)

Related tasks

[Manage workload SLAs](#)

### View queue details

Use the View queues details page to view the details of a particular queue.

## Prerequisites

Permissions required:

- 
1. Queue Creator or Queue Participant 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 vertical ellipsis button
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:
  - a) Active when work item is currently being processed or staged for processing
  - b) Complete when work item successfully processed by a Bot Runner or marked Complete
  - c) Unsuccessful when work item processing failed on Bot Runner
  - d) Ready to run when work item is successfully processed for execution does not have any data errors and can be staged for processing
  - e) On hold when work item is deferred from processing by a Bot Runner
  - f) Data error when there is an error in loading data from the file
- b) 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 list form. Use this to edit, delete or modify the column view and change the status of all or selected work items.
  - 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.

## 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 queue tables](#)

## Actions allowed on queue tables

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, My Access, Queue Name, and Work Item Result 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.
- 11.3.3** Apply filters to Work Item Result to quickly track the final status of the work item. For example if the work item was completed or skipped.

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: <ul style="list-style-type: none"> <li>Active when work item is currently being processed. This means the bots corresponding to that work item are running.</li> <li>Complete when work item successfully processed by a Bot Runner or marked Complete.</li> <li>Unsuccessful when work item processing failed on Bot Runner.</li> <li>Ready to run when work item is successfully processed for execution does not have any data errors and can be staged for processing.</li> <li>On hold when work item is deferred from processing by a Bot Runner</li> <li>Data error when there is an error in loading data from the file</li> </ul>
<b>11.3.3</b> Work Item Result	Shows the value that you set in the Set work-item result command. See <a href="#">Set work item result command</a> .
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.

Tip: 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.

- 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 re-size

Use the following tasks on an individual work item:

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.

Alternately, select all devices and use the following action. Note that these actions can be performed only at a table level and not on individual 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.
Ready to run	Allows you to mark one or more work items as Ready to run 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 Ready to run
Customize columns	Allows you to show or hide specific columns. By default, all columns are displayed including the ones defined in the work item.

## 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 vertical ellipsis button
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](#)

[View queue details](#)

[Delete Queues](#)

## View automation of a queue

Use the View activity in progress page to Pause, Resume, or Stop an 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

## Procedure

1. Go to Workload Queues
2. Hover over a queue with status In use
3. Click the vertical ellipsis button

This launches the In progress View activity in progress page where you can Pause/Resume or Stop the automation.

Note: Although this page is accessible from the Workload module, the page is launched from Activity module. However, 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.

- Click the Pause button  
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.
- Click the Resume button.

The system will start distributing the work items from this queue.

- Click the Stop button

The system stops distributing the work items from the queue associated with this automation.

4. Select any of the following option in the message
  - Click Accept to return to the Queues page.
  - Click Cancel to return to the In progress page.

## Next steps

[Edit queues](#)

Related tasks

[View queue details](#)

[Delete Queues](#)

## 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 vertical ellipsis button
  - 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.

## Next steps

[Manage workload SLAs](#)

Related tasks

[View queue details](#)

[View automation of a queue](#)

[Edit queues](#)

## Manage Work Items

Manage work items of a queue to fix the discrepancies before queue processing and reduce your automation-related errors.

To manage work items, do the following:

Step 1: [View work items](#)

View work items with a status of Completed, Unsuccessful, On hold, Active, or Data Error in the View work item page.

Step 2: [Edit work items](#)

Use the Queues page or the Work item page to edit the work items of a queue if their status is Unsuccessful, On hold, or Data Error.

Step 3: [Delete work items](#)

Delete work items one at a time or in bulk in the View work item page. You are allowed to delete a work item only if its status is not Active.

Related tasks

[View queue details](#)

## View work items

View work items with a status of Completed, Unsuccessful, On hold, Active, or Data Error in the View work item page.

## Prerequisites

Permissions required:

1. AAE\_Queue Admin role
2. View and manage my Queues feature permission
3. Queue Owner, Queue Consumer, and/or Queue Participant

## Procedure

1. Go to Workload > Queues.
2. Select and open a queue in view or edit mode.
3. Hover over a work item to view it.
4. Click the vertical ellipsis button.
5. 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.
6. In the Work Item Details section, view the following:
  - a) Status
    - a) Successful or Unsuccessful for work items that have failed, are in unknown state or stopped.
    - b) Pending for work items that are deferred, new or paused.
    - c) Active for work items that are already processed in the queue and are running.
    - d) Data error for work items that are being uploaded from the file.
    - e) **11.3.3** Ready to run for work items that are being processed in the queue.
  - b) Status Details
    - a) Successful for work item with a status of NA.
    - b) Unsuccessful for work items with one or more errors has an Unknown status or is stopped.
    - c) Active for work item with a status of NA.
    - d) Pending for a work item that is new, deferred, or paused.
    - e) Data Error for work items with one or more errors.
  - c) Start time and End time: This is shown when the work item is being processed.
  - d) Queue Name: View the name of the queue of this work item.
7. 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.
8. In the Automation section, view the name of the automation, bot name, and device pool under which this work item was processed.
9. In the Work Item Results section, view the output status of the work item processed in the Enterprise Control Room  
Tip: If a chat bot is integrated with the Enterprise Control Room, the work item status can be shown to a customer by retrieving the result with the help of a REST API. See [List all work items in a queue](#)
10. In the General Details section, view the Last modified date and time, Modified by, and Object type.

## Next steps

1. [Edit work items](#)
2. [Delete work items](#)

Related reference

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[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 if their status is Unsuccessful, On hold, or Data Error.

### Prerequisites

Permissions required:

1. AAE\_Queue Admin role
2. View and manage my Queues feature permission
3. Queue Owner, Queue Consumer, and/or Queue Participant

### 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 vertical ellipsis button.
    - c) Click Edit.
  - Work Item page > Edit buttonThe 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 types 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.  
See the [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. You are allowed to delete a work item only if its status is not Active.

### Prerequisites

Permissions required:

1. AAE\_Queue Admin role
2. View and manage my Queues feature permission

---

3. Queue Owner, Queue Consumer, and/or Queue Participant

## 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 vertical ellipsis button.
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 tasks

[Manage workload SLAs](#)

### Related reference

[Sample Workload Management properties file](#)

[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
Active	Work item is currently being processed	View
Completed	Work item successfully processed by a Bot Runner	View and Delete
Unsuccessful	Work item processing failed on Bot Runner	View, Edit, and Delete
Ready to run	Work item is successfully processed for execution	View, Edit, and Delete
On hold	Work item is deferred for use by the Queue admin	View, Edit, and Delete
Data Error	Error in loading data from the file	View, Edit, and Delete
Paused	Work item processing was paused by the Queue admin	View, Edit, and Delete

### Related tasks

[Edit work items](#)

## Manage workload SLAs

Estimate the device pool size or time required to process a given queue size from the Workload Service Level Agreement (SLA) page.

### Prerequisites

Permissions required to orchestrate [Workload Management](#) to meet your organizations' target SLA:

1. Enterprise Control Room admin or a user with the SLA Calculator feature permission
2. AAE\_Queue\_Admin role
3. Queue Owner, Participant, or Consumer privilege

Tip: You can see only those automations with queues for which you are either the owner /participant / consumer. However, the Queue Admin can see all the queues in the system.

### Procedure

1. Select an active automation to arrive at the targeted SLA.  
You can also directly enter the parameters for calculation if you do not have an existing automation. If specified, the data from this is used to calculate the SLA in the Calculation tab.
2. Click the right arrow button to add the automation for the SLA calculation.
3. Click Next.  
The Calculation tab appears.
4. If you have selected an existing automation, the system populates the number of work items processed and the average processing time of a work item for that automation.
5. Enter the following:
  - a) Number of work items processed. The maximum number of work items allowed are up to 999999999999 (ninety-nine billion, nine hundred ninety-nine million, nine hundred ninety-nine thousand, nine hundred ninety-nine). For example, enter 67890.
  - b) Average processing time per work item either in days, hours, minutes, or seconds. For example, 2000 seconds or 33 minutes and 20 seconds.
  - c) The number of devices in your device pool in The processing time with this number of devices field to calculate the time it takes to process the number of work items specified with the given average processing time of each work item. For example, the number of devices for processing time is 120.
6. Click Calculate  
The system shows the result based on the specified parameters. For example, your SLA will be 8 hours and 20 minutes if the above example is considered.
7. Enter The number of devices with this total processing time field to calculate the device pool size.
8. Click Back to return to the previous tab if required.

### Next steps

- [Add or insert data for work items in a given queue](#) in the Enterprise Control Room.
- [Fetch the list of work items in a given queue and share the result with customers using a chat application.](#)

## Sample Workload Management properties file

**11.3.1.2** The Workload Management configuration file wlm.properties enables an Enterprise Control Room administrator to customize the workload-related properties based on the organization's automation requirements. For example, users can configure the time interval required to trigger an automation.

### Sample code

Use the following sample code to configure the [Workload Management](#)-related properties:

```
wlm.db.staging.size=100
wlm.db.staging.low.water.mark=70
wlm.staging.upper.water.mark=50
wlm.staging.low.water.mark=35
wlm.ignite.low.water.mark=5

wlm.file.upload.encrypt.lines.count=100
wlm.file.upload.batch.size=100

workOrder.concurrent.execution.count=5
workOrder.max.execute.lines=1000

workOrder.execution.job.interval.seconds=30
allowed.workItem.processing.deviation=2
wlm.device.timeout.minutes=30
wlm.minimum.seconds.between.deploy=10
wlm.deploy.compensation.seconds=20
wlm.priority.pool.redeploy.minutes=30

wlm.automation.trigger.interval.millis=900000
```

1. Copy the code to a file and save it as a wlm.properties file in the config folder of the Enterprise Control Room application path.

For example C:\Program Files\Automation Anywhere\Enterprise\config

2. You can change the properties based on the organization's workload automation requirements.

For example, change the automation trigger interval. The default time is set to 15 minutes or 900000 milliseconds.

3. Restart the Automation Anywhere Enterprise Control Room Service for the changes to apply.  
 Note: The wlm.properties file is available in the config folder by default from Version 11.3.3.

Related reference

[Workload Management properties configuration description](#)

## Workload Management properties configuration description

**11.3.1.2** Use the list of Workload Management properties as a reference when you update the configurations in the wlm.properties file.

### Configuration description with default values

Configuration	Default value	Description
wlm.db.staging.size	100	<p>Determines the number of work items that can be moved from new to draft state for staging to the messaging queue cache in a single instance. The state is marked internally. These are staged in order.</p> <p>For example, if you use 5 devices, the staging will start from 500 (100 x 5) Work Items.</p> <p>Note that <a href="#">Work Item</a> refers to a row or line in a CSV file being processed.</p>
wlm.db.staging.low.water.mark	70	<p>Determines the minimum number of staged Work Items that can be pushed to the messaging queue cache. When the number of staged Work Items are less than this value, the next batch of Work Items are moved to staging.</p> <p>For example, if you use 5 devices, the queue will include 350 (70 x 5) Work Items as the low water mark.</p>
wlm.staging.upper.water.mark	50	Determines the maximum number of staged Work Items that can be pushed to the Apache Ignite queue cache.

Configuration	Default value	Description
		For example, if you use 5 devices, 250 (50 x 5) work items can be queued.
wlm.staging.low.water.mark	35	<p>Determines the number of work items that can be pushed from staging to queue to the Apache Ignite queue cache when the Work Items are less than the number given in this property.</p> <p>Note that the queue processing is continuous and this count keeps decreasing. Use this to maintain the level of Work Items that can be pushed from staging to queuing stage.</p> <p>For example, if you use 5 devices the Work Items are to be queued when the number is below 175 (35 x 5).</p>
wlm.ignite.low.water.mark	5	Not Applicable from Version 11.3.3.
wlm.file.upload.encrypt.lines.count	100	Determines the number of Work Items that can be encrypted.
wlm.file.upload.batch.size	100	Not Applicable from Version 11.3.3
workOrder.concurrent.execution.count	5	<p>Determines the maximum number of work orders that can be processed at a time.</p> <p>For example, you can concurrently process a maximum of 5 work orders when the property value is set to 5.</p> <p>Note that a work order is a background job that ingests set of Work Items for processing. For example, a</p>

Configuration	Default value	Description
		work order can contain 100 Work Items.
workOrder.max.execute.lines	1000	Determines the maximum number of Work Items in a work order that can be processed at a time. This is useful when data with large volumes are uploaded.
workOrder.execution.job.interval	30 seconds	Determines the default time interval between the processing of pending work orders.
allowed.workItem.processing.duration	2 hours	Not Applicable
wlm.minimum.seconds.between.deploy	10	Determines the minimum time between two concurrent Work Item deployments.  This is not applicable from Version 11.3.3
wlm.priority.pool.redeploy.minutes	30	Determines the time interval specified in priority mode after which the Work Items are to be redeployed to all Bot Runner devices.
wlm.automation.trigger.interval	100000	Determines the time interval (in milliseconds) for processing staged and/or queued Work Items. For example, when you create a new automation at 10:00, it will process the work item for queuing at 10:10.
wlm.workitems.columns.subcrub  11.3.3	False	Determines whether to truncate the characters of a data in a column when processing the Work Items. It is recommended that you keep this turned off as it runs on each field and affects data ingestion.

Related reference

[Sample Workload Management properties file](#)

## Bot Store integration overview

**11.3.3** The seamless integration of the Bot Store enables you to access the Bot Store directly from the Enterprise Control Room. In the Enterprise Control Room, you can download bots and Digital Workers from the Bot Store or create and package Digital Workers and bots to be uploaded to the Bot Store.

### Benefits of Bot Store integration

- Discover and download pre-built, ready-to-use [Digital Workers](#) and bot packages from the [Bot Store](#) to the [Control Room](#).
- Leverage the 'one-stop-shop' solution to configure and run the downloaded bot in the Enterprise Control Room.

### What are Digital Workers and protected bots

#### Digital Workers

Digital Workers are a set of role-related automation tasks that are performed in a sequence.

Digital Workers automate entire processes, do multiple tasks in a set of sequences, and are ready-to-deploy and download from the Automation Anywhere [Bot Store](#).

For example, an Accounts Payable Digital Worker can be used to automate invoice processing, payment processing, and record management.

#### Protected bots

The Bot Store offers developers, who build Digital Workers or bot packages, a monetization opportunity by protecting the business logic contained within the bots. When you run a protected bot, the commands that are executed are not displayed in the In progress activity page.

- [Accessing Bot Store](#)

All Enterprise Control Room users can access Bot Store from the Home tab within the Bot Store tab.

- [Downloaded bots from Bot Store](#)

The My Downloads page displays information about all the bots and Digital Workers that you have downloaded from the Bot Store.

- [Running protected bots](#)

When you run a bot from the Enterprise Control Room, you can view its status, progress, activity being performed, and other information on the In progress activity page.

#### Related tasks

[Accessing Bot Store](#)

[Downloading bots to Enterprise Control Room repository](#)

#### Related reference

[Downloaded bots from Bot Store](#)

[Folder structure of downloaded bots](#)

[Running protected bots](#)

## Accessing Bot Store

**11.3.3** All Enterprise Control Room users can access Bot Store from the Home tab within the Bot Store tab.

### Prerequisites

You must have valid Bot Store credentials and an Internet connection to access the Bot Store from the Enterprise Control Room. If you do not have valid Bot Store credentials, you must register with the Bot Store before accessing it from the Enterprise Control Room.

Note: You cannot use your Enterprise Control Room credentials to access the Bot Store.

To access the Bot Store, do the following:

### Procedure

1. Navigate to Bot Store > Home.
2. Click Open Bot Store.  
Automation Anywhere opens the Bot Store in a separate tab.
3. Log in using your Bot Store credentials.

## Downloaded bots from Bot Store

**11.3.3** The My Downloads page displays information about all the bots and Digital Workers that you have downloaded from the Bot Store.

When you access the page for the first time, you are required to log in using your Bot Store credentials. The system keeps you logged in for seven days. After seven days, you are required to log in to the Bot Store again.

Note: If you do not have valid Bot Store credentials, you must register with the Bot Store. After you have registered with the Bot Store, you can use the registered email ID and password to log in to the Bot Store from Enterprise Control Room. See [Accessing Bot Store](#).

The list of bots or Digital Workers available on this page is the same as the list on the My Downloads page in the Bot Store. The list displays the bots and Digital Workers downloaded by you (the user that has logged in to the Bot Store from the Enterprise Control Room).

The My Downloads page provides the following information:

- TYPE: Specifies whether it is a bot or Digital Worker.
- NAME: Specifies the name of the bot or Digital Worker.
- ORDER DATE: Specifies the date and time the bot or Digital Worker was purchased or downloaded.
- OWNER NAME: Specifies the name of the person or organization that owns the bot or Digital Worker.
- PURCHASE TYPE: Specifies whether the bot or Digital Worker is available for free or must be purchased.

Note: This column is hidden by default, you must unhide the column to display it on the page.

You can perform the following operations on this page:

- Use the Refresh table icon to refresh the list of downloaded bots and Digital Workers.
- Show or hide columns that are displayed in the table.
- Sort and filter the list based on the TYPE, NAME, OWNER NAME, and PURCHASE TYPE attributes. You can use the same attributes to search for a bot or Digital Worker.
- Download a bot or Digital Worker available on this page to the Enterprise Control Room repository. See [Downloading bots to Enterprise Control Room repository](#).

#### [Downloading bots to Enterprise Control Room repository](#)

You can download bots that are available on the My Downloads page to the My bots page.

#### [Folder structure of downloaded bots](#)

When you download a bot or Digital Worker from the Bot Store to the Enterprise Control Room repository, it creates various folders within the Bot Store folders. These folders contain dependent files that the bot or Digital Worker uses.

## Downloading bots to Enterprise Control Room repository

**11.3.3** You can download bots that are available on the My Downloads page to the My bots page.

### Prerequisites

Ensure that you have the `AAE_Bot_Store_Consumer` role assigned to you. See [System created roles](#).

You must have upload permission to the `Bot_Store` folder available within the `My_Tasks` folder. If the bot or Digital Worker you are downloading contains a MetaBot, you must also have upload permission to the `My_MetaBots` folder.

To download a bot to the Enterprise Control Room repository, do the following:

### Procedure

1. Navigate to Bot Store > My Downloads.
2. Search for the bot that you want to download.  
You can search for a bot or Digital Worker based on the TYPE, NAME, OWNER NAME, and PURCHASE TYPE attributes.
3. Hover your mouse over the ellipses to display the Download to my bots icon.  
Note: The Download to my bots icon is available only if you have the `AAE_Bot_Store_Consumer` role assigned to you.

This icon is not available for the bots and Digital Workers that are created in the Enterprise client version earlier than the Version 11.3.3.

4. Click the Download to my bots icon.  
The Download to my bots page appears.
5. Select any of the following options to specify the action to take if the bot package already exists in the Bot Store folder in the Enterprise Control Room:
  - Skip the file (don't download it): Does not download the bots from the Bot Store that are already available in the bot package.
  - Overwrite the file with the downloaded one: Overwrites the bot available in the Enterprise Control Room repository with the bot downloaded from the Bot Store.
  - Cancel the download: Cancels the download of the bot from the Bot Store.

The following options are available if version control is enabled in the Enterprise Control Room:

- Create a new version: Creates a new version of the bot that is downloaded from the Bot Store.
- Skip the file (don't download it): Does not download the bots from the Bot Store that are already available in the bot package and are of the same version.
- Cancel the download: Cancels the download of the bot from the Bot Store.
  - a) Select an option to specify how to handle the production version of the bot if you have selected the Create a new version option:
    - b) Keep production version as is currently set: Select this option if you do not want to change the current production version of the bot.
    - c) Set production version to imported version of file: Select this option if you want to change the production version to the version of the downloaded bot.

#### 6. Click Download to my bots.

The system downloads the bot package or Digital Worker from the Bot Store, extracts the files from the package, and copies the files into the relevant folders. The system creates a folder with the same name as that of the downloaded bot or Digital Worker within the `Bot_Store` folder. It also creates other relevant folders and copies the dependent bots and other files in those folders.

Note: If the downloaded bots or Digital Workers contain a MetaBot, that MetaBot is stored in the `My MetaBots` folder.

You can view the progress of the bot being downloaded from the [In progress activity](#) page. See [In progress activity](#).

Note:

The system does not display an error message if the download fails. The reason for why the download failed is available on the Audit log page.

If the bot or Digital Worker you have downloaded from the Bot Store uses any credential variables, these variables are not created in the Credential Vault.

## Folder structure of downloaded bots

**11.3.3** When you download a bot or Digital Worker from the Bot Store to the Enterprise Control Room repository, it creates various folders within the Bot Store folders. These folders contain dependent files that the bot or Digital Worker uses.

All the bots and Digital Workers that are available on the Bot Store are submitted as a package, which contains different folders containing files that are used as input and to store the output generated by these bots and Digital Workers. The dependent files are available in specific folders in a specific directory structure under the Bot Store folder in the Enterprise Control Room.

Note: If the downloaded bots or Digital Workers contain a MetaBot, that MetaBot is stored in the `My MetaBots` folder.

Use the Bot Store sub-folder under the My Tasks folder to access the dependent files for a bot or Digital Worker. The folder structure is similar for all bots and Digital Workers that you download from the Bot Store. The following example shows the folders available for a bot and Digital Worker downloaded from the Bot Store.

Table 1. Sample Digital Worker or Bot Package Structure

Digital Worker Folder	Sub-folders
<Digital Worker or bot package name>	<p>My Tasks: Can contain only the .atmx file type.</p> <p>Store the Master Bot and all the other sub-tasks referred by the Master Bot in this sub-folder.</p>
	My Metabots: Can contain only the .mbot file type.
	Error Folder: Can contain all the file types except .atmx and .mbot files
	Input Folder: Can contain all the file types except .atmx and .mbot files

## Running protected bots

**11.3.3** When you run a bot from the Enterprise Control Room, you can view its status, progress, activity being performed, and other information on the In progress activity page.

To protect the intellectual property of the Bot Creators, information about the command and logic of the bot downloaded from the Bot Store is not exposed. When you run a protected bot, information about the command being executed is not shown on the In progress activity page. Similarly, for a protected bot, information about the last command executed is not displayed on the Historical activity page. See [Run a Bot](#).

You can identify a protected bot based on the value available in the PROTECTION TYPE column on the My bots page. A bot is protected if the value is Protected for that bot in the PROTECTION TYPE column.

Note: This column is hidden by default, you must unhide the column to show it on the page.

A bot or Digital Worker that you have downloaded may contain dependent bots that are protected. To view information about the dependent bots and whether they are protected or not, you can click the View bot icon on the My bots page. However, information about the command being executed is not shown for the dependent bots that are protected.

## Audit log overview

Across the platform, event details along with the outcome are automatically captured for more than 60 types of entity actions, including creation, modification, enablement, disablement, and removal of users, bots, Bot Creators, and Bot Runners. Comprehensive and continuous audit logging capabilities in the Enterprise Control Room ensures enterprise-level security and quality compliance.

As an Enterprise Control Room administrator or a user with Audit Log privileges, view logs and details of both successful and unsuccessful activities in the Audit log page.

## Audit log actions

In the Audit log page you can do the following:

- Time filter - view activities for specific time period. Default time filter setting is Last 24 hours. Select from preset time filters or configure a custom time filter.
- Search - Search the entries of the table. To search the exact phrase, enclose the search phrase within double quotes. Combine Time and Search filters to refine your search. For example, you can filter the audit log to search for Status = Successful for Last 7 days.
- Export data - export checked items to a CSV file based on month, filters, or selection
- View - view details of a table entry, mouse over the entry to expand and click Audit details. Refresh the contents to view the updated status.
- Customize columns to show or hide specific columns.

## How to work efficiently with audit log entries

You can perform the following actions on a column of the Audit log table to help you work efficiently:

- Click a column to sort it in ascending and descending order. 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 on 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.
- View details of selected audit log using  which is seen after you move your mouse over the Actions icon .
- Specify search parameters for the same column for the Enterprise Control Room to search using OR operator. Specify search parameters for different columns, for using the AND operator.

Note: When you use special keys "-" or "\_", the system lists all Item Names, Source Devices, and Request ID instead of these columns having these parameters.

- [View audit details](#)

The Enterprise Control Room admin or a user with Audit Log privileges can track the activity details from the Audit Log page.

- [Audit logs for run bot deployment and bot runner session](#)

As a Control Room administrator or a user with "View everyone's audit log actions" privileges, you can view audit entries for Run Bot Deployment and Bot Runner Sessions in the Audit log page of the Enterprise Control Room.

- [Audit logs for bots downloaded from the Bot Store](#)

Enterprise Control Room administrators or a user with "View everyone's audit log actions" privileges can view audit entries for the bots or Digital Workers downloaded from the Bot Store in the Audit log page of the Enterprise Control Room. Audit logs for the above include successful and unsuccessful entries.

### Related tasks

[View audit details](#)

## View audit details

The Enterprise Control Room admin or a user with Audit Log privileges can track the activity details from the Audit Log page.

## Procedure

1. Click Audit Log.
2. (Optional) Use the Time Filter drop-down to change the interval time for the activity log.

The Time Filter is set to 24 hours by default.

3. (Optional) Use the All columns drop-down and the Search field to find a specific action item.

The Actions table lists the various available 'Action' items.

4. To view the details of any 'Action', click the  >  icon.

Action Details page is displayed with the following details:

- Status

Shows if the selected action was succeeded or failed.

- Action taken by

The user name who performed the action.

- Object type

Type of object for the selected action.

- Source device

The IP address of the source device.

- Request ID

Details of the Request ID.

- Item name

Name of the item (if available).

- Time

The time stamp of the user login.

- Action type

Details of the type of action performed.

- Source

Name of the source.

Note: Only those fields where updates are available can be viewed. Also, the information that is stored in the Credential Vault is displayed (encrypted).

Note: It is not recommended to restart only the Automation Anywhere Elastic Search Service as it results in an error on the Enterprise Control Room Audit log page.

Related concepts  
[Credentials - Overview](#)

## Audit logs for run bot deployment and bot runner session

As a Control Room administrator or a user with "View everyone's audit log actions" privileges, you can view audit entries for Run Bot Deployment and Bot Runner Sessions in the Audit log page of the Enterprise Control Room.

Audit logs for the above include both entries - Successful and Unsuccessful.

The following illustration shows entries relevant to Bot Deployment or through RDP i.e. Bot Runner Session:

The screenshot shows the Audit log section of the Control Room interface. The left sidebar includes links for DASHBOARDS, ACTIVITY, BOTS, DEVICES, WORKLOAD, AUDIT LOG (which is selected), and ADMINISTRATION. The main area has a header 'Audit log' with a time filter set to 'Last 7 days'. Below this are two dropdown menus: 'Action type' (set to 'Choose action type') and 'Action type: Bot runner Session' (with a sub-option 'Action type: Run bot Deployed'). A table titled 'Actions (10 of 131)' lists ten entries. The columns are STATUS, TIME, ACTION TYPE, ITEM NAME, ACTION TAKEN BY, SOURCE DEVICE, SOURCE, and REQUEST ID. The entries are as follows:

STATUS	TIME	ACTION TYPE	ITEM NAME	ACTION TAKEN BY	SOURCE DEVICE	SOURCE	REQUEST ID
<span style="color:red;">✖</span> Unsuccessful	18:00:02 07-06-2018	Bot Runner Session	System	automationanywhere	Control Room	be2a3c7-ebab-4a33-89...	⋮
<span style="color:green;">✔</span> Successful	18:00:01 07-06-2018	Run bot Deployed	Download_file 18.0706.1..	System	automationanywhere	79fa50b-59bd-4436-ba...	⋮
<span style="color:red;">✖</span> Unsuccessful	18:14:54 07-06-2018	Bot Runner Session	System	automationanywhere	Control Room	12a35e02-0f5a-4b6d-86...	⋮
<span style="color:green;">✔</span> Successful	18:14:13 07-06-2018	Run bot Deployed	Analytics_ATM Reconcilia...	System	automationanywhere	34219b4a-8581-4f62-80...	⋮
<span style="color:red;">✖</span> Unsuccessful	18:05:58 07-03-2018	Bot Runner Session	System	automationanywhere	Control Room	37ec5e30-270b-45f1-92...	⋮
<span style="color:green;">✔</span> Successful	18:05:49 07-03-2018	Run bot Deployed	Download_file 18.0703.1..	System	automationanywhere	0ac8446c-1055-4c13-91...	⋮
<span style="color:green;">✔</span> Successful	18:00:54 07-03-2018	Bot Runner Session	System	automationanywhere	Control Room	55795941-41a1-4a18-b0...	⋮
<span style="color:green;">✔</span> Successful	18:01:44 07-03-2018	Run bot Deployed	Download_file 18.0703.1..	System	automationanywhere	e4595b7d-bcc6-4b10-8b...	⋮
<span style="color:red;">✖</span> Unsuccessful	18:15:48 07-03-2018	Bot Runner Session	System	automationanywhere	Control Room	a5bb66e0-7bd1-4361-a3...	⋮
<span style="color:green;">✔</span> Successful	18:15:48 07-03-2018	Run bot Deployed	Download_file 18.0703.1..	System	automationanywhere	fb25qa63-450f-464f-bf2...	⋮

## Run bot deployment

Entries for a successful or unsuccessful bot deployment using the action Run now are logged in the Audit log page of the Enterprise Control Room. The following illustration shows successful deployment of a bot

on a Bot Runner machine:

[Audit log](#) > [View action](#)

### Run bot Deployed

[< Back](#)

#### ACTION DETAILS

Status  
Successful  
Action taken by  
System  
  
Object type  
Action  
  
Source device  
automationanywhere  
  
Request ID  
3421984e-858f-4f62-8f0e-d4fa932adf73

Item name  
Analytics\_ATM Reconciliation.18.07.06.14.13.58.ellie.brown  
Time  
14:14:13 IST  
2018-07-06  
Action type  
Run bot Deployed  
Source  
Control Room

#### RUN BOT DEPLOYED DETAILS

ATTRIBUTE	VALUE
Automation name	Analytics_ATM Reconciliation.18.07.06.14.13.58.ellie...
Bot	Analytics_ATM Reconciliation.atmx
Device	PRODUCTLT07.AASPL-BRD.COM
Username	amy.chen
Started on	2018-07-06 14:14:13 IST
Schedule Type	N/A

## Reasons for run bot deployment failure

The reason for a run bot deployment failure is logged when,

1. Bot Runner could not be reached or shows disconnected, which could be due to:
  - a) The Enterprise client Service not running on the Bot Runner machine.
  - b) Bot Runner machine is shut down
  - c) Network issues
  - d) Bot Runner user is not logged on to the Enterprise client.
2. Bot Runner is disabled
3. Bot Runner could not download the deployed package

## Bot Runner Session

The audit entry for a Bot Runner Session is logged to indicate whether a bot was deployed successfully to a Bot Runner machine using methods such as RDP. The following illustrates a successful Bot Runner Session:

The screenshot shows the Audit log > View action page for a successful Bot Runner Session. It includes two main sections: ACTION DETAILS and BOT RUNNER SESSION DETAILS.

**ACTION DETAILS**

Status	Successful
Action taken by	System
Object type	Action
Source device	automationanywhere
Request ID	557f5961-41e1-4a18-b055-fc2a5302f358

**BOT RUNNER SESSION DETAILS**

ATTRIBUTE	VALUE
Automation name	Download_File.18.07.03.14.01.37.elie.brown
Bot	Download_File.aapk
Device	ENGGLT114 AASPL-BRD.COM
Username	soumya

Similarly, when a Bot Runner Session fails, the audit details display the reasons in Results panel.

## Reasons for Bot Runner Session failure

The reason for a Bot Runner session failure is logged when the Bot Runner's remote desktop session cannot be acquired in the following cases,

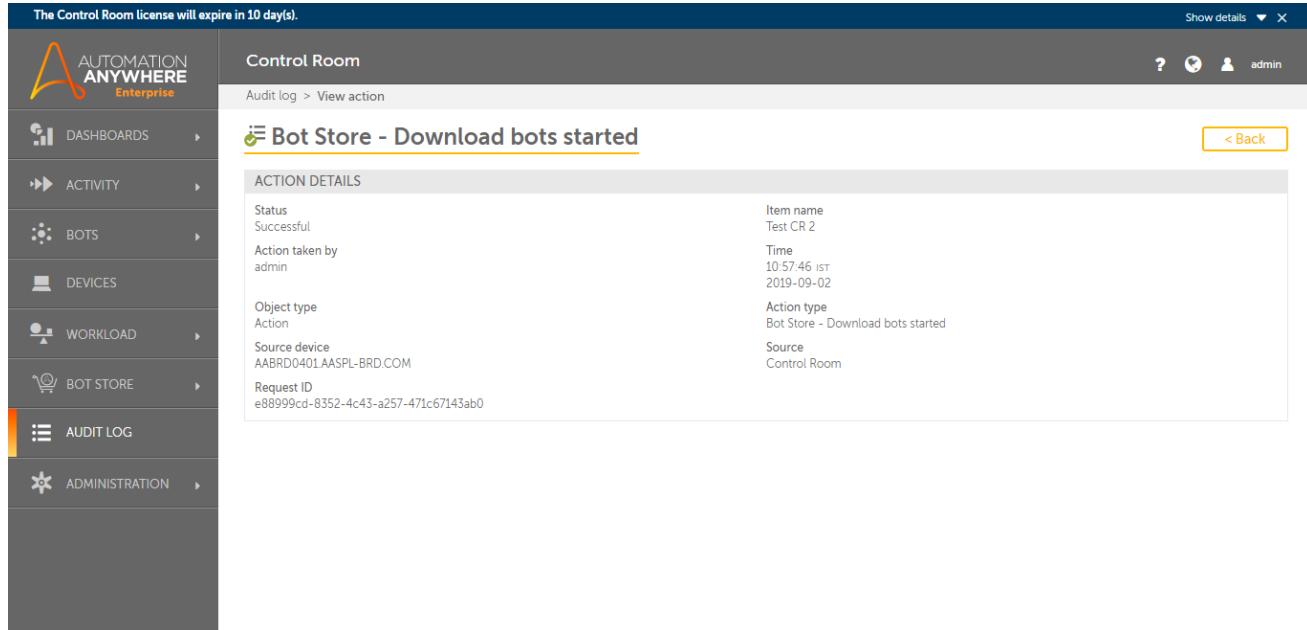
1. User has not set the Windows Login Credentials in the Tools Options Login Settings of Enterprise client.
2. User has selected Bypass legal disclaimer in the Tools Options Login Settings of Enterprise client.
3. Automation Anywhere Player is already running on the Bot Runner.
4. Remote Desktop Session to the Bot Runner is disabled
5. Either the RDP port is blocked, there is a network error, or the Bot Runner hostname was not resolved

## Audit logs for bots downloaded from the Bot Store

Enterprise Control Room administrators or a user with "View everyone's audit log actions" privileges can view audit entries for the bots or Digital Workers downloaded from the Bot Store in the Audit log page of the Enterprise Control Room. Audit logs for the above include successful and unsuccessful entries.

## Bot Store - Download bots started

The entries for a successful or unsuccessful operation of starting the download process of a bot from the Bot Store to the Enterprise Control Room are logged in the Audit log page. The following illustrator shows successful start of downloading bots from the Bot Store:



The screenshot shows the 'Audit log' section of the Control Room interface. A specific entry is highlighted:

**Action Details:**

- Status: Successful
- Action taken by: admin
- Object type: Action
- Source device: AABRD0401.AASPL-BRD.COM
- Request ID: e88999cd-8352-4c43-a257-471c67143ab0
- Item name: Test CR 2
- Time: 10:57:46 IST  
2019-09-02
- Action type: Bot Store - Download bots started
- Source: Control Room

## Bot Store - Download bots finished

The entries for a successful or unsuccessful operation of finishing the download process of a bot from the Bot Store to the Enterprise Control Room are logged in the Audit log page. The following illustrator shows

successful finish of downloading bots from the Bot Store:

The Control Room license will expire in 9 days.

**Control Room**

Audit log > View action

**Bot Store - Download bots finished**

**ACTION DETAILS**

Status	Successful	Item name	CyclickDependency - BotStore - Test3
Action taken by	admin	Time	14:41:14 IST 2019-09-03
Object type	Action	Action type	Bot Store - Download bots finished
Source device	WIN-9NBQCCBM2DADEV.COM	Source	Control Room
Request ID	01959562-82cb-4255-904b-fcd12ea895f5		

**BOT STORE - DOWNLOAD BOTS FINISHED DETAILS**

ATTRIBUTE	VALUE
Bot Store URL	https://34.220.224.190/
If a file already exists	Skip the file
Bot(1)	Automation Anywhere\My Tasks\Bot Store\...
Bot(2)	Automation Anywhere\My Tasks\Bot Store\...

Note: The Bot Store - Download bots finished log appears before the Bot Store - Download bots started log for the bot packages or Digital Workers that are small in size.

## Reasons for download bot failure

The process of downloading a bot from the Bot Store might fail because of the following reasons:

- The connection to the Bot Store is lost when the system is downloading a bot.
- The Enterprise client version of the bot or Digital Worker is not Version 11.3.3 or later.
- Lack of space in the Enterprise Control Room repository.
- The connection to the shared repository for Enterprise Control Room is lost when the system is downloading a bot.

## Dashboards overview

The Enterprise Control Room dashboard provides graphical insight into your RPA infrastructure so that you can analyze, interpret, and make informed decisions for your bots.

The information about active users, registered clients, failed tasks, applications, bots, bot schedules, workflows, queues, and the overall status of devices (memory, CPU, and hard disk utilization) is dynamically updated on the dashboards.

## Why use dashboards?

- Leverage real-time analytics to make business decisions.

- Enforce corrective actions on resource allocations, configurations, and automation sequence based on operational details.
- Generate customizable dashboards specific to each entity using features, for example, filtering and sorting, to identify and alert abnormal activities.
- Get insight into all operational details of the bots as they are running.
- Ensure comprehensive insight into digital workforce performance by setting the time bar for each widget.

## What you must know about operational and business analytics

### Operational analytics

Monitor the performance of a bot, task status, past and upcoming schedules of tasks, audit information, utilization of various resources, workload status, and health of the machine on which the tasks are running.

The dashboards available for operational analytics are home, bots, devices, audit, and workload.

### Business analytics

Leverage transactional analytics information to make business decisions, for example, the total sales in a month, invoicing and payment trends, insight about new customers, and quote to order ratio.

Access business analytics from the Insights dashboard in the Enterprise Control Room.

#### Related concepts

[Dashboards - workload](#)

[Dashboards - audit](#)

[Dashboards - devices](#)

[Dashboards - bots](#)

[Dashboards - home](#)

#### Related tasks

[Dashboards - Insights](#)

#### Related reference

[How Business Analytics works](#)

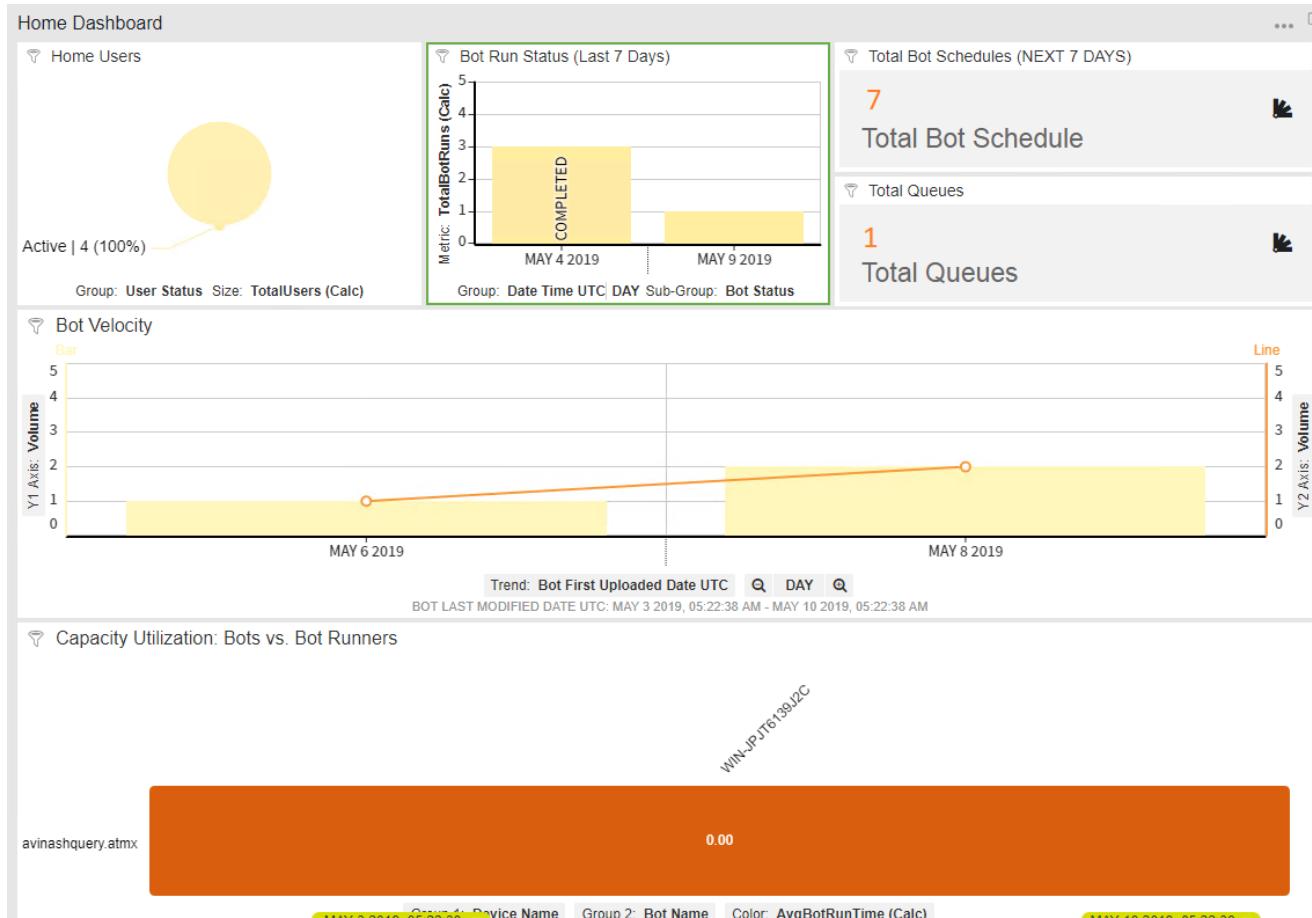
## Dashboards - home

As an Enterprise Control Room user with View dashboards privileges, view data to which you have access permission presented in the form of widgets.

### Home dashboard

The Home dashboard displays various widgets that provide information such as the number of active users, number of bots scheduled for the next 7 days, bot velocity, and capacity utilization of the bot runner

machine.



**Home Users:** Displays information about the total number of active users in the Enterprise Control Room.

**Bot Run Status:** Displays information about the status of a bot for the last seven days.

**Total Bot Schedules:** Displays information about the total number of bots that have been scheduled for the next seven days.

**Total Queues:** Displays information about the total number of active queues.

**Bot Velocity:** Displays information about the trend of the bots that were built and uploaded on the Enterprise Control Room.

**Capacity Utilization:** Displays information about the distribution of bots across various devices. You can use this widget to identify the machines that are used more and distribute bots across other machines that are less utilized.

## Dashboards - bots

As an Enterprise Control Room user with View my bots and View my scheduled bots privileges, view the Bots page of the Dashboards module.

# Bots dashboard

The Bots dashboard displays various widgets that provide information about deployed bots such as bots consuming most resources, bots scheduled to run, bots that failed to run, and status of bots.



Bots Heartbeat: Provides a statistical representation of the relationship between the failure score of a bot and the respective bot. A failure score is a calculation of the resource utilization when you run a bot. The formula for calculating the failure score is:

Failure score = (0.5\*Memory usage) + (0.3\*CPU usage) + (0.2\*HDD usage)

MVP bot: Provides information about the bots with maximum processing times and the number of times they run.

**Bot Status:** Provides information about the status of the bots that were executed.

**Top Failure Reasons:** Provides information about the errors the deployed bots encounters. The errors are categorized into various groups and the number of errors for each group is displayed.

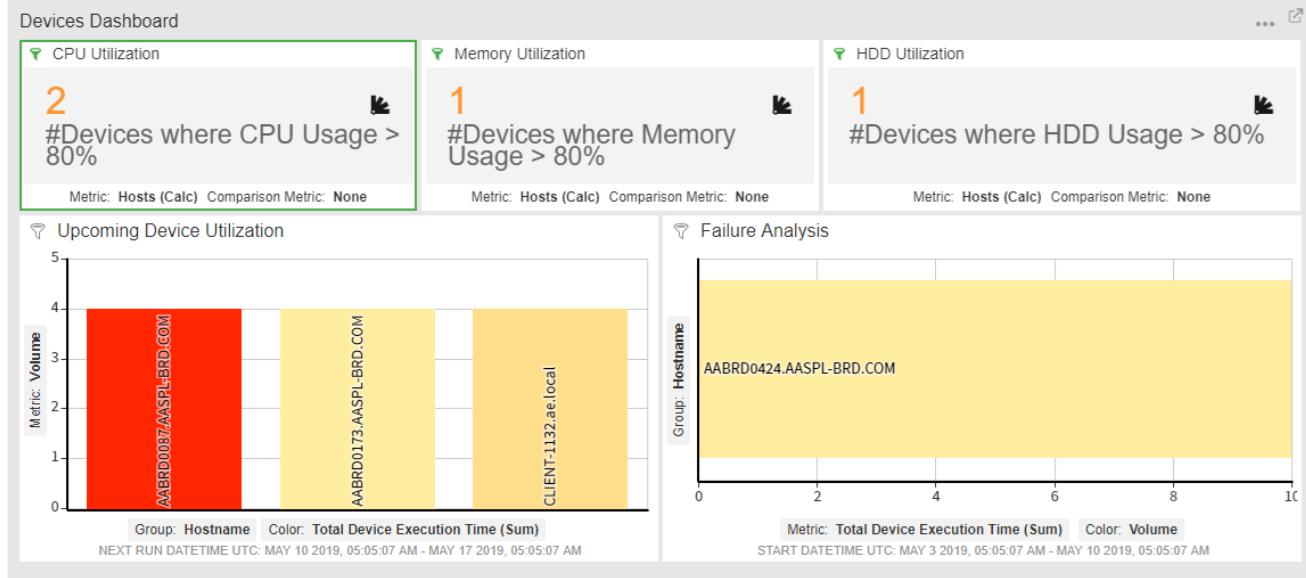
Upcoming Schedules: Provides information about all the bots that are scheduled to run.

## Dashboards - devices

As an Enterprise Control Room user with Dashboard view privileges, view and analyze data related to devices (Bot Runner machines) when bots are deployed on them.

## Devices dashboard

The Devices dashboard displays various widgets that provide information about the resource utilization of the machines on which the bots are executed.



**CPU Utilization:** Provides information about the number of devices that have crossed the threshold utilization of CPU on which the bot is executed for a specific period.

**Memory Utilization:** Provides information about the number of devices that have crossed the threshold utilization of memory on which the bot is executed for a specific period.

**HDD Utilization:** Provides information about the number of devices that have crossed the threshold utilization of the hard disk space on which the bot is executed for a specific period.

**Upcoming Device Utilization:** Provides information about the number of devices on which automation are scheduled to run.

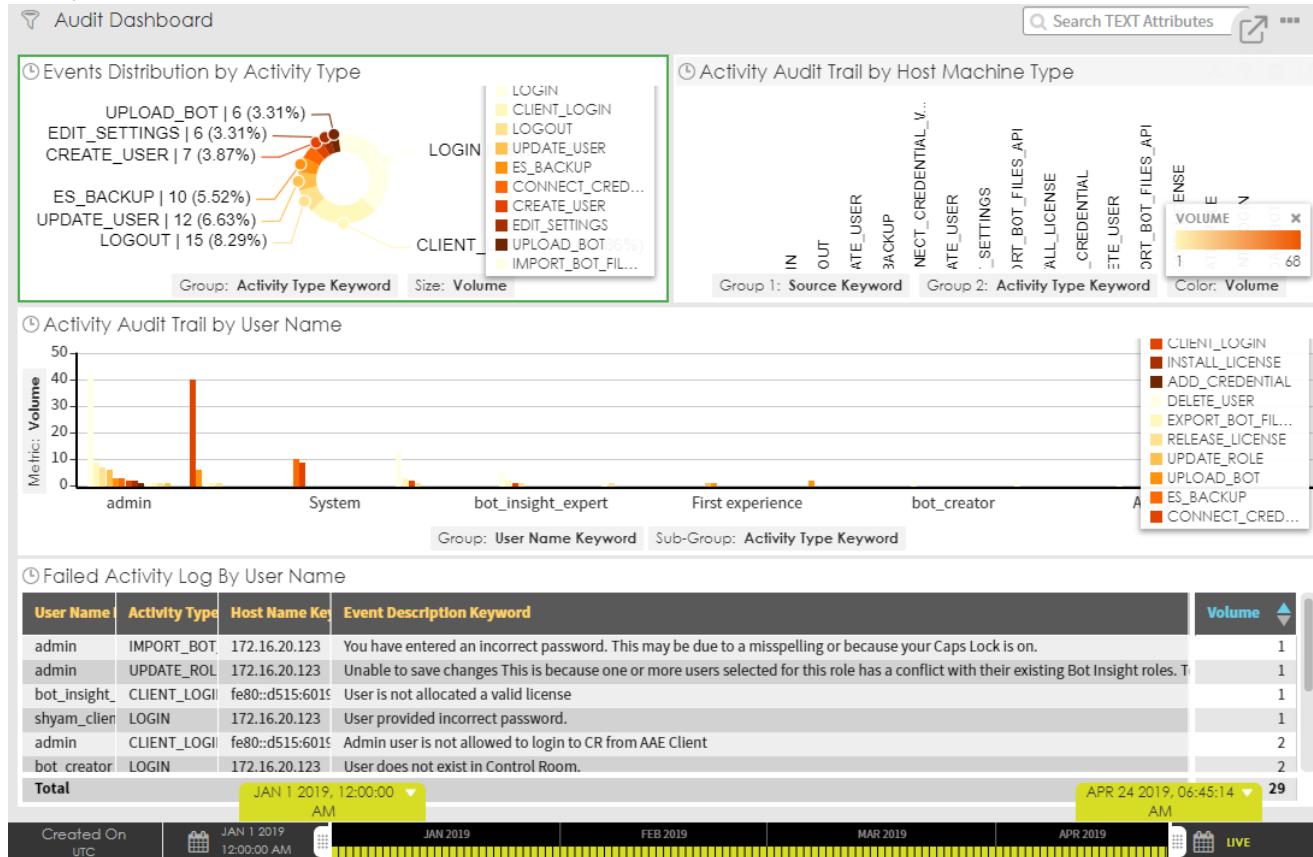
**Failure Analysis:** Provides information about the devices with the maximum number of failures for a specific period.

## Dashboards - audit

A user with View everyone's audit log actions permission can view a snapshot of audit information as captured in the Enterprise Control Room.

## Audit dashboard

The Audit dashboard displays various widgets that provide information about various events performed in the Enterprise Control Room.



Note: You can view this dashboard only if the role assigned to you has the permission to view audit logs. See [Role-Based Access Control](#).

**Events Distributed by Activity Type:** Provides information about the activities performed within a specific period. The activities are filtered based on the Action Type column in the Audit Log page.

**Activity Audit Trail by Host Machine Type:** Provides information about the activities performed within a specific period. The activities are filtered based on the Source column in the Audit Log page.

**Activity Audit Train by User Name:** Provides information about the activities performed by a user within a specific period.

**Failed Activity Log by User Name:** Provides information about the failed activities for a user within a specific period.

## Dashboards - workload

An Enterprise Control Room user with View Dashboard permissions can view the workload status of device pools, queues, and work items in the Executive Dashboard and/or Operation Manager Dashboard.

### Workload dashboard

The Workload dashboard provides information about the status of device pools, queues, and work items in the Executive dashboard tab and the Operation Manager's dashboard tab. The Executive dashboard tab enables you to monitor the progress of the queues for which you are an owner or a consumer. The Operation Manager's tab enables you to monitor the queues for which you are an owner, consumer, or participant.

#### EXECUTIVE DASHBOARD

Device pools by backlog: Provides information about the device pools by backlog. The device pool backlog is measured as the time required to complete the existing work item from all automation tasks in that pool. You can adjust the device pool size or reorder the automation tasks as per your requirement.

Queues by time to complete: Provides information about the list of queues ordered by time to complete. Time to complete is measured as the time required to complete the existing work items. You can pause or change the priority of an automation task. You can click an individual queue to view details such as queue name, number of open items, average processing time, and expected time to complete.

Queue status: Provides information about the queues that are processed in the last 7 days. The status for the work items of each queue is displayed and enables you to monitor the progress of your workload items.

Queue with average processing time: Provides information about the queues that were processed in the last 7 days with the average processing time. The queues listed are based on the average processing time for a work item compared to a daily average.

#### OPERATION MANAGER'S DASHBOARD

Device pools by FTE: Enables you to view pools in descending order of Full Time Equivalent (FTE). This allows you to evaluate the value of each pool in the equivalent manual effort required to process the same work item.

Pools by decreasing error rate: Enables you to view pools ordered by decreasing error rate and enables you to identify the pools that require attention. The error rate is calculated as the number of work items with an error by the number of work items processed from that pool.

Device pools by backlog: Provides information about the device pools by backlog. The device pool backlog is measured as the time required to complete the existing work item from all automation tasks in that pool. You can adjust the device pool size or reorder the automation tasks as per your required.

Queues with average wait time: Enables you to view the list of queues that are processed in the last 7 days with the average wait time. This helps you to decide whether to increase the priority or pool size as per your business needs. The wait time is calculated by subtracting the processing start time from the automation start or resume time.

Queues by decreasing error rate: Enables you to view the list of queues ordered by decreasing error rate and helps you identify the queues that require attention. The error rate is calculated as the number of work items with error divided by the number of work items processed from that pool.

## Dashboards - Insights

Bot Insight helps automation experts to access real-time business insights and digital workforce performance measurement by leveraging productivity data that the deployed bots generate and process. It helps the automation experts and consumers to interactively analyze task data using widgets.

### Prerequisites

- To access the Bot Insight application from the Enterprise Control Room Insights dashboard, you must either be a Bot Creator and/or a Enterprise Control Room user with AAE\_Bot Insight Admin, AAE\_Bot Insight Consumer, or AAE\_Bot Insight Expert privileges.
- To access Bot Insight, ensure the Bot Insights - Business Analytics license is enabled.

### Procedure

1. Go to Enterprise Control Room > Dashboards > Insights.
2. Click Open Bot Insight.  
Automation Anywhere opens the Bot Insight dashboard in a separate tab.
3. Enter the Bot Insight login credentials.  
If you are already logged into the Enterprise Control Room, you do not need to login again into Bot Insights. For more information about the Single Sign-on feature into applications, see [Log onto Bot Insights](#).
4. Click Go to Enterprise Control Room and re-login as a user with the appropriate permissions if you do not have the required Bot Insight permissions or if the Bot Insight license has expired.

### Next steps

For more information, see [Business Analytics](#).

## Enterprise Control Room APIs

The Automation Anywhere Enterprise Control Room provides various public APIs which allow you to customize your business automation for third-party applications.

These APIs enable the third-party applications to consume RPA, orchestrate bots and manage the RPA data based on events.

Use these APIs to manage your business automation using third-party applications.

- [Enterprise Control Room API for Authentication](#)

All the APIs are preceded by an Authentication API, wherein the invoking third party application user has to authenticate so as to use the downstream APIs.

- [Enterprise Control Room API to manage bots login credentials](#)  
Use the bots login API to automate the login process that allows a user with appropriate privileges to create, update or delete login credentials stored in the Credential Vault.
- [Enterprise Control Room Automations API](#)  
Use the Enterprise Control Room bot Automations API to trigger deployment of bots from an external system or a third-party application.
- [Workload Management API overview](#)  
Use the Workload Management (WLM) API to programmatically manage and create queues and work items in your Enterprise Control Room.
- [API to export and import Bots for Bot Lifecycle Management](#)  
Use the export and import bots APIs to customize the organization's bot Lifecycle Management solution for an uninterrupted automation life-cycle.
- [APIs to manage credential vault](#)  
As a Enterprise Control Room user with Manage my credentials and lockers role permissions, use the Credential Vault APIs to manage your Credentials, Attributes, Lockers, and Credential Vault mode in the Enterprise Control Room.
- [API for data migration from 10.x Enterprise Control Room to 11.x Enterprise Control Room](#)  
As a Enterprise Control Room administrator with View and Manage Migration role permissions, use the Migration APIs to migrate data from 10.x Enterprise Control Room to the current Enterprise Control Room version 11.x.
- [API for deploying and monitoring bot progress](#)  
As a Enterprise Control Room administrator or a user with View and Manage Scheduled Activity permission, deploy bots and monitor its progress using a set of Enterprise Control Room APIs.
- [Bot Insight Data API](#)  
Get bot process data for analytic analysis. Only users with Bot Insight administration role can access this API.
- [API to add and remove manual dependencies](#)  
Use the Manual Dependencies API to manually add and/or remove dependent files to/from a TaskBot from My Docs, My Exes, and My Scripts folders in the repository.
- [Filters in an API request body](#)  
Filtering provides basic conditional queries and page control for processing web pages. There are 3 basic features related to filtering: filtering conditions, sorting columns, and pagination parameters.

## Enterprise Control Room API for Authentication

All the APIs are preceded by an Authentication API, wherein the invoking third party application user has to authenticate so as to use the downstream APIs.

### Authentication API

Enterprise Control Room v.11.x exposes public APIs so as to manipulate the control-room data and to deploy bots from an external system. This enables third party applications to consume RPA, orchestrate bots, and to manage the RPA data based on events. For example, create an Automation Anywhere user as soon as a user is created in an SAP system, or update the login credentials in Automation Anywhere as soon as a password is rotated in domain controller.

API: v1/authentication

If the Enterprise Control Room URL is `https://<your-control-room-url>`, then the API will be `https://<your-control-room-url>/v1/authentication`.

The API takes two mandatory parameters and 1 optional parameter as input in JSON format:

- The `username` of the Automation Anywhere user.
- The `password` of the Automation Anywhere user.
- The `apiKey` needed only when the Enterprise Control Room is configured for Single Sign On (SSO). Remove this field if your Enterprise Control Room does not use SSO.

```
{
  "username": "string",
  "password": "string",
  "apiKey": "string"
}
```

For example:

- The Automation Anywhere username is `mike_williams`.
- The Automation Anywhere password is `abc123`.

Here is the JSON request format used with an Enterprise Control Room that does not have SSO enabled.

```
{
  "username": "mike_williams",
  "password": "abc123"
}
```

If the authentication is successful, the Enterprise Control Room issues an authentication token which needs to be passed on to other Enterprise Control Room APIs as header information.

Note: The authentication token will only be valid for 15 minutes from the time it is issued.

## Authentication API Response Codes

Http Status code	Response	Description
200	<pre>{   "token": "eyJ0eXAiOiJKV1QiLCJhbGciOiJIUzI1NiJ9.eyJ1c2VyIjoiMSIsImlzcyI6Imh0dHA6Ly9sb2Nhbgvhc3Qvd2ViY3JzdmMvIiwiYXVkJjoiaHR0cDovL2xvY2FsaG9zdC93ZWJjcgnN2Yy8iLCJle</pre>	Successful authentication returns a token.

Http Status code	Response	Description
	<pre>HAIoJE0OTUwOTksIm5iZiI6MTQ5NTA4OTE5OX0.qPP hpti0j7 LGAmWkj3XFymFfJXzA1P4zPehIjVYfulc" }</pre>	
401	<pre>{ "message": "Invalid credentials." }</pre>	<ul style="list-style-type: none"> <li>The password is invalid.</li> <li>The user does not exist.</li> <li>The Active Directory (AD) authentication credentials are invalid.</li> </ul>
401	<pre>{ "message": "Verify your email by clicking on the email verification link. This is mandatory as you will be able to login post verification only." }</pre>	Email notification is enabled, and the user has not verified the email address.
402	<pre>{ "message": "License expired." }</pre>	One or more licenses are expired.
403	<pre>{ "message": "Your account is not activated. Cont" }</pre>	The user account is inactivated.

Http Status code	Response	Description
	<pre>act the admin." }</pre>	

- [Create and assign API key generation role](#)

API key generation is available in Enterprise Control Room v11.3.2 and later. By default this parameter is not enabled for any of the System-created roles. An administrator is able to create a custom role for API key generation and assign that custom role to users.

### Create and assign API key generation role

API key generation is available in Enterprise Control Room v11.3.2 and later. By default this parameter is not enabled for any of the System-created roles. An administrator is able to create a custom role for API key generation and assign that custom role to users.

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.
9. Assign the custom role you just created to non-admin users.

### Next steps

Users with the assigned custom role for API key generation see the Generate API-Key link under their username located at the top right corner of the Enterprise Control Room page.

#### Related reference

[Enterprise Control Room API for Authentication](#)

## Enterprise Control Room API to manage bots login credentials

Use the bots login API to automate the login process that allows a user with appropriate privileges to create, update or delete login credentials stored in the Credential Vault.

## Login credentials

When the bot is deployed from Enterprise Control Room to the Bot Runner, the bot will auto-login into the Bot Runner (if the machine is locked / logged off). The Bot will use the credentials stored in the Credential Vault for auto-login. These credentials are set by the user using the Tools Options [Login Settings](#) of Enterprise client.

However, there could be cases when the user's Windows password is modified; especially in Enterprises where there is a password rotation policy. In such cases, the user has to remember to update the new password from Tools Options Login Settings.

To automate the above process, Enterprise Control Room 11.1 provides a direct API to create, update or delete the Login Credentials stored in the Credential Vault.

There are 2 steps to use this API:

1. Invoke the Authentication API
2. Invoke the Login Credentials API

### Authentication API

The details for the Authentication API are provided in the article [Enterprise Control Room API for Authentication](#).

### Login Credentials API

Note: Only Enterprise Control Room Administrators (users having AAE\_Admin Role) have access to use the Login Credentials API; this means that if the user invoking the Authentication API has an AAE\_Admin role, only that user is able to use the Login Credentials API.

Also, this API will make use of 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 Login Credentials API.

API: v1/credentialvault/external/credentials/loginsetting

If the Enterprise Control Room URL is <https://ultron.com:81>, then the API will be: <https://ultron.com:81/v1/credentialvault/external/credentials/loginsetting>

The API takes three parameters as input in JSON format:

1. The username of the Automation Anywhere user.
2. The Login (Windows) username for the user which is to be updated in the Credential Vault against that user.
3. The Login (Windows) password for the user which is to be updated in the Credential Vault against that user.

Note: All parameters are mandatory.

For example:

If we take a 'Database Authentication' scenario (where users are stored and authenticated by the Enterprise Control Room)

1. The Automation Anywhere username is mike\_williams

2. The fully qualified Login username is ultron.com\mike.williams

3. The Login password is abc123, then the JSON will be

```
{ "Username": "mike_williams", "Windows_Username": "ultron.com\\mike.williams",
  "Windows_Password": "abc123" }
```

Using the Login Credentials API, the Enterprise Control Room Admins can:

1. Create a user's Login Credentials in the Enterprise Control Room - by using the 'POST' method
2. Update a user's Login Credentials in the Enterprise Control Room - by using the 'PUT' method
3. Delete a user's Login Credentials from Enterprise Control Room - by using the 'DELETE' method.

## VB Script to Create User's Login Credentials

```
'AUTHENTICATION API - START

Set objStream = CreateObject("ADODB.Stream")

objStream.CharSet = "utf-8"

objStream.Open

objStream.LoadFromFile("D:\Deven.Deshpande\Office\Products\API for CV\auth-input.txt")

restRequest = objStream.ReadText()

objStream.Close

Set objStream = Nothing

contentType = "application/json"

Set oWinHttp = CreateObject("WinHttp.WinHttpRequest.5.1")

oWinHttp.Open "POST", "http://products1t12.aaspl-brd.com:81/v1/authentication",
False

oWinHttp.setRequestHeader "Content-Type", contentType

oWinHttp.Send restRequest

response = oWinHttp.StatusText

MsgBox response

Dim AuthToken

'Set oJson = new aspJSON

AuthToken = oWinHttp.ResponseText

'oJson.loadJSON(AuthToken)
```

```
'MsgBox oJson.data("token")

MsgBox AuthToken

'AUTHENTICATION API - ENDS

-----
'RESPONSE HEADER PARSING - START

Dim sToken

Dim posUser

sToken = Right(AuthToken, Len(AuthToken) - 10)

MsgBox(sToken)

'sToken = Left(sToken, Len(sToken) - 4)

posUser = InStr(sToken, "user")

MsgBox posUser

sToken = Left(sToken, posUser - 4)

MsgBox(sToken)

'RESPONSE HEADER PARSING - END

'DEPLOYMENT API - START

Set objStream_dep = CreateObject("ADODB.Stream")

objStream_dep.CharSet = "utf-8"

objStream_dep.Open

objStream_dep.LoadFromFile("D:\Deven.Deshpande\Office\Products\API for CV\cred-input.txt")

restRequest = objStream_dep.ReadText()

objStream_dep.Close

Set objStream = Nothing

contentType = "application/json"

Set oWinHttp = CreateObject("WinHttp.WinHttpRequest.5.1")

oWinHttp.Open "PUT", "http://products1t12.aaspl-brd.com:81/v1/credentialvault/external/credentials/loginsetting", False

oWinHttp.setRequestHeader "Content-Type", contentType
```

```
oWinHttp.setRequestHeader "X-Authorization", sToken  
oWinHttp.Send restRequest  
response = oWinHttp.StatusText  
MsgBox response  
Dim DeployResponse  
DeployResponse = oWinHttp.ResponseText  
'MsgBox DeployResponse  
'DEPLOYMENT API - ENDS
```

## Contents of Input Files

Applicable to the above VB Script

The text of auth-input.txt will have the input JSON String for authentication  
{ "UserName": "admin", "Password": "12345678" }

The text for deploy-input.txt will have the input JSON String for deployment

```
{ "Username": "mike_williams", "Windows_Username": "ultron.com\\mike.williams", "Windows_Password":  
"abc123" }
```

Related reference

[Enterprise Control Room API for Authentication](#)

## Enterprise Control Room Automations API

Use the Enterprise Control Room bot Automations API to trigger deployment of bots from an external system or a third-party application.

### Automation API

To deploy bots onto the Automation Environment, currently the user has to login to Enterprise Control Room, select the bot and the Bot Runners and then 'Run/Schedule' the task.

However, as the Automation scenarios scale up, there is an increasing need to deploy/trigger bots from an external third party application.

To meet this business requirement, Automation Anywhere has published Application Programming Interfaces (APIs) using which a bot can be triggered from an external system.

A Enterprise Control Room user can use these APIs to deploy bots (Tasks) to Bot Runners on commencement of events specified by a third-party/external application.

Note: You cannot deploy Attended bots from the Enterprise Control Room. Only Unattended bots are available for deployment from the Enterprise Control Room.

## Key Features and Business Benefits of Enterprise Control Room APIs

- bots can be deployed from an external third party systems using Automation Anywhere APIs.
- The input and output of APIs is JSON based (industry standard data-interchange format).
- bot Deployment can be orchestrated from an External Application / Workflow using a combination of scripts and Automation Anywhere APIs.

Note: The bot deployment API can ONLY be invoked after the system/user has authenticated using the Authentication API

Also, the user will need to have the 'Run my bots' privileges and the privileges of the Bot Runners on which the bot is to be deployed.

### Deployment endpoint

The Deployment endpoint is used to deploy bots to Bot Runners.

API: <Enterprise Control Room URL>/v1/schedule/automations/deploy

The user can pass three parameters as JSON string.

1. bot name with relative path – This is mandatory.
2. List of Bot Runners and users in JSON format – This is mandatory.
3. Use RDP based approach – This is optional and set to false by default.

Deployment Scenario and corresponding JSON string:

1. For example, the name of the bot is Accountsbot.atmx and the bot is under 'My Tasks'
2. The bot is to be deployed on 3 machines
  - First machine hostname BR-1 with user U-1
  - Second machine hostname BR-2 with user U-2
3. The JSON string in the above scenario will be:

```
{
  "taskRelativePath": "string",
  "botRunners": [
    {
      "client": "BR-1",
      "user": "U-1"
    },
    {
      "client": "BR-2",
      "user": "U-2"
    }
  ]
}
```

## Response Codes

Http(s) Status code	Response - Description
200	Successful creation of automaton.
400	Bad Request
401	Authentication Required
403	Unauthorized access
409	Conflict
500	Internal Server error

Related reference

[Enterprise Control Room API for Authentication](#)

## Workload Management API overview

Use the Workload Management (WLM) API to programmatically manage and create queues and work items in your Enterprise Control Room.

### WLM queues

WLM queues contain work items that are distributed for processing to unattended bot runners within a device pool.

Filters allow you to refine what is returned in the response body. Read more about filters in [Filters in an API request body](#).

List queues

```
POST http://<your_control_room_url>/v2/wlm/queues/list
```

Body parameters: This request body example includes filters, sorting, and page control to refine the response.

```
{
  "filter": {
    "operator": "NONE",
    "operands": [
      null
    ],
    "field": "string",
    "value": "string"
  }
}
```

```

},
"sort": [
{
  "field": "string",
  "direction": "asc"
}
],
"page": {
  "offset": 0,
  "length": 0
}
}
}

```

Make a post request to return a list of all WLM queues, or use filters in the request body to refine the response results. Request and response examples:

- Retrieve data on all available queues
- Use filters to retrieve selected WLM queues

## WLM work items

Create a work item in a queue

```
POST http://<your_control_room_url>/v2/wlm/queues/{id}/workitems
```

URL parameter:

.../queues/{id}/...: The numeric value that identifies a WLM queue that list work items.

Body parameters: The generic request example does not identify the details of the JSON object.

```

{
  "workItems": [
    {
      "json": {}
    }
  ]
}

```

The following request body example includes a JSON object listing the mandatory key-value pairs that represent a WLM work item.

```
{
  "workItems": [],
  "json": {
    "Id": "string",
    "Customer Name": "string",
    "Amount": "number",
    "email": "string",
    "Invoice Date": "ISO 8601 date and time notation"
  }
}
```

A JSON object has key-value pairs that are required for specific WLM implementations. Make a post request to add a new work item to an existing queue. Read more about how to [Create a work item in a queue](#).

Update a work item in a queue

```
PUT http://<your_control_room_url>/v2/wlm/queues/{id}/workitems/{id}
```

URL parameters:

- .../queues/{id}...: The numeric value that identifies a WLM queue that list work items.
- .../workitems/{id}: The numeric value that identifies a WLM work item within a queue.

Body parameters:

```
{
  "version": 0,
  "status": "Enum",
  "result": "string",
  "json": {}
}
```

The following request body example includes a JSON object listing the mandatory key-value pairs that represent a WLM work item.

```
{
  "version": "0",
  "result": "",
  "status": "Enum",
  "json": {
```

```

    "Id": "string",
    "Customer Name": "string",
    "Amount": "number",
    "email": "string",
    "Invoice Date": "ISO 8601 date and time notation"
}
}

```

Status enum array values:

```

Enum:
[ READY_TO_RUN, DATA_ERROR, UNKNOWN, STAGED, QUEUED, ACTIVE, UNSUCCESSFUL
, SUCCESSFUL, ON_HOLD ]

```

Click the link for a step by step example of how to update a work item [Update work item data, results and status](#).

List work items in a queue

```
POST http://<your_control_room_url>/v2/wlm/queues/{id}/workitems/list
```

URL parameter:

.../queues/{id}/...: The numeric value that identifies a WLM queue that list work items.

Body parameters: This request body example includes filters, sorting, and page control to refine the response.

```
{
  "filter": {
    "operator": "NONE",
    "operands": [
      null
    ],
    "field": "string",
    "value": "string"
  },
  "sort": [
    {
      "field": "string",

```

```

        "direction": "asc"
    }
],
"page": {
    "offset": 0,
    "length": 0
}
}

```

Click the link for a step by step example of how to make a post request to [List all work items in a queue](#).

Delete work items from a queue

```
POST http://<your_control_room_url>/v2/wlm/queues/{id}/workitems/delete
```

URL parameter:

`.../queues/{id}/...`: The numeric value that identifies a WLM queue that list work items.

Body parameters:

```
{
    "workitemIds": [
        0,
        1,
        2
    ]
}
```

Click the link for a step by step example of how to delete work items from a queue [Delete work items in a queue](#).

Retrieve data on all available queues

Send a post request from the WLM API to retrieve all queues for your Enterprise Control Room.

## Prerequisites

### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

## 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 [Enterprise Control Room API for Authentication](#).

- URL: `http://<your_control_room_url>/v2/wlm/queues/list`
- Method: POST

Note:

- 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.

Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.

2. Select POST as the method.
3. Leave the request body blank to request information on all available WLM queues.

Request body:

```
{ }
```

4. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

The response for this example returned data for 3 queues. When there is no filtering used in the request, a successful responses returns all of the queues for the specified Enterprise Control Room.

Response body:

```
"page": {
    "offset": 0,
    "total": 3,
    "totalFilter": 3
},
"list": [
    {
        "id": "5",
        "name": "q1",
        "status": "IN_USE",
        "description": "",
        "reactivationThreshold": "1",
        "manualProcessingTime": "0",
        "manualProcessingTimeUnit": "SECONDS",
    }
]
```

```
"workItemModelId": "1",
"considerReactivationThreshold": false,
"createdBy": "25",
"createdOn": "2019-09-10T21:02:46.067Z",
"updatedBy": "0",
"updatedOn": "2019-09-10T23:31:16.681Z",
"tenantId": "1",
"version": "31"
}, {
"id": "6",
"name": "q2",
"status": "IN_USE",
"description": "",
"reactivationThreshold": "1",
"manualProcessingTime": "1",
"manualProcessingTimeUnit": "HOURS",
"workItemModelId": "2",
"considerReactivationThreshold": false,
"createdBy": "25",
"createdOn": "2019-09-10T21:03:36.897Z",
"updatedBy": "0",
"updatedOn": "2019-09-10T23:31:17.004Z",
"tenantId": "1",
"version": "22"
}, {
"id": "7",
"name": "q3",
"status": "IN_USE",
"description": "",
"reactivationThreshold": "1",
"manualProcessingTime": "1",
"manualProcessingTimeUnit": "DAYS",
"workItemModelId": "3",
"considerReactivationThreshold": true,
"createdBy": "25",
"createdOn": "2019-09-10T21:04:26.760Z",
```

```

    "updatedBy": "25",
    "updatedOn": "2019-09-26T20:54:33.658Z",
    "tenantId": "1",
    "version": "27"
  } ]
}

```

### Response headers

```

cache-control: no-cache, no-store, max-age=0, must-revalidate
connection: keep-alive
content-length: 1415
content-security-policy: default-src 'self'
content-type: application/json
date: Mon, 23 Sep 2019 17:17:28 GMT
expires: 0
pragma: no-cache
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. Here is a Curl example of the request. This example is formatted for readability. Replace text inside the angel brackets, <text>, with the appropriate values.

```

curl -X POST "http://<your_control_room_url>/v2/wlm/queues/list"
-H "accept: application/json"
-H "X-Authorization: <authentication_token>"
-H "Content-Type: application/json" -d "{}"

```

### Use filters to retrieve selected WLM queues

Send a post request with filters to retrieve specific Workload Management (WLM) queues for your Enterprise Control Room.

### Prerequisites

#### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

## 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 [Enterprise Control Room API for Authentication](#).

- URL: `http://<your_control_room_url>/v2/wlm/queues/list`

Replace the content in the angel brackets with information for your Enterprise Control Room.

- Method: POST

## Procedure

1. Add an authentication token to the request header.  
Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.
2. Select POST as the method.
3. Add filter parameters in the request body to limit the information returned from all available WLM queues.

```
{
  "filter": {
    "operator": "gt",
    "operands": [
      ],
      "field": "id",
      "value": "6"
    },
    "sort": [
      {
        "field": "id",
        "direction": "asc"
      }
    ],
    "page": {
      "offset": 0,
      "length": 100
    }
}
```

4. Send the request.
  - In a REST Client, click SEND.
  - In Swagger interface, click Execute.

The response for this example returned on 1 queue that met the filter requirements.

#### Response body

```
{  
  "page": {  
    "offset": 0,  
    "total": 3,  
    "totalFilter": 1  
  },  
  "list": [  
    {  
      "id": "7",  
      "name": "q3",  
      "status": "IN_USE",  
      "description": "",  
      "reactivationThreshold": "1",  
      "manualProcessingTime": "1",  
      "manualProcessingTimeUnit": "DAYS",  
      "workItemModelId": "3",  
      "considerReactivationThreshold": false,  
      "createdBy": "25",  
      "createdOn": "2019-09-10T21:04:26.760Z",  
      "updatedBy": "0",  
      "updatedOn": "2019-09-10T23:31:46.995Z",  
      "tenantId": "1",  
      "version": "24"  
    }  
  ]  
}
```

#### Response headers

```
cache-control: no-cache, no-store, max-age=0, must-revalidate  
connection: keep-alive  
content-length: 527  
content-security-policy: default-src 'self'  
content-type: application/json
```

```

date: Mon, 23 Sep 2019 17:50:15 GMT
expires: 0
pragma: no-cache
x-content-type-options: nosniff
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block

```

Here is a Curl example of the same REST request. The example is formatted for readability.

```

curl -X POST "http://<your_control_room_url>/v2/wlm/queues/list"
-H "accept: application/json" -H "X-Authorization: <authentication_token>
"
-H "Content-Type: application/json" -d "{ \"filter\": { \"operator\": \"gt\",
\",
\"operands\": [ ], \"field\": \"id\", \"value\": \"6\" }, \"sort\": [ { \"field\": \"id\",
,
\"direction\": \"asc\" } ], \"page\": { \"offset\": 0, \"length\": 100 }}"

```

## List all work items in a queue

Automation Anywhere provides a REST API that enables you to retrieve a list of work items in a given queue.

## Prerequisites

### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

### 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 [Enterprise Control Room API for Authentication](#).

- End point: [https://<your\\_control\\_room\\_url>/v2/wlm/queues/{id}/workitems/list](https://<your_control_room_url>/v2/wlm/queues/{id}/workitems/list)
- Method: POST

## Procedure

1. Add an authentication token to the request header.

Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.

2. Enter the following parameters in the request body.

There are 2 inputs required for this request.

Id

7

Request body:

```
{  
  "filter": {  
    "operator": "and",  
    "operands": [  
      {  
        "field": "id",  
        "operator": "gt",  
        "value": "30800"  
      },  
      {  
        "field": "id",  
        "operator": "lt",  
        "value": "30900"  
      }  
    ]  
  "page": {  
    "length": 3,  
    "offset": 0  
}
```

## Next steps

Response body:

```
{  
  "page": {  
    "offset": 0,  
    "total": 229,  
    "totalFilter": 12  

```

```
{  
    "id": "30888",  
    "createdBy": "1",  
    "createdOn": "2019-09-10T21:09:50.722Z",  
    "updatedBy": "0",  
    "updatedOn": "2019-09-10T21:13:46.304Z",  
    "version": "5",  
    "json": {  
        "Invoice Id": "INV0004",  
        "Customer Name": "APIName1",  
        "Amount": 9007199254740991,  
        "email": "API123@gmail.com",  
        "Invoice Date": "2017-06-12T00:18:48Z"  
    },  
    "result": "",  
    "deviceId": "3",  
    "status": "SUCCESSFUL",  
    "startTime": "2019-09-10T21:12:16.599Z",  
    "endTime": "2019-09-10T21:13:17.062Z",  
    "col1": "INV0004",  
    "col2": "APIName1",  
    "col3": "9.007199254740991E15",  
    "col4": "API123@gmail.com",  
    "col5": "2017-06-12T00:18:48Z",  
    "deviceUserId": "0",  
    "queueId": "7",  
    "comment": "",  
    "automationId": "6",  
    "totalPausedTime": "0",  
    "error": "",  
    "col6": "",  
    "col7": "",  
    "col8": "",  
    "col9": "",  
    "col10": ""  
},
```

```
{  
    "id": "30889",  
    "createdBy": "1",  
    "createdOn": "2019-09-10T21:09:51.383Z",  
    "updatedBy": "0",  
    "updatedOn": "2019-09-10T21:13:46.255Z",  
    "version": "5",  
    "json": {  
        "Invoice Id": "INV0004",  
        "Customer Name": "APIName1",  
        "Amount": 9007199254740991,  
        "email": "API123@gmail.com",  
        "Invoice Date": "2017-06-12T00:18:48Z"  
    },  
    "result": "",  
    "deviceId": "4",  
    "status": "SUCCESSFUL",  
    "startTime": "2019-09-10T21:12:23.841Z",  
    "endTime": "2019-09-10T21:13:24.265Z",  
    "col1": "INV0004",  
    "col2": "APIName1",  
    "col3": "9.007199254740991E15",  
    "col4": "API123@gmail.com",  
    "col5": "2017-06-12T00:18:48Z",  
    "deviceUserId": "0",  
    "queueId": "7",  
    "comment": "",  
    "automationId": "6",  
    "totalPausedTime": "0",  
    "error": "",  
    "col6": "",  
    "col7": "",  
    "col8": "",  
    "col9": "",  
    "col10": ""  
},
```

```
{  
    "id": "30890",  
    "createdBy": "1",  
    "createdOn": "2019-09-10T21:09:52.324Z",  
    "updatedBy": "0",  
    "updatedOn": "2019-09-10T21:13:46.347Z",  
    "version": "5",  
    "json": {  
        "Invoice Id": "INV0004",  
        "Customer Name": "APIName1",  
        "Amount": 9007199254740991,  
        "email": "API123@gmail.com",  
        "Invoice Date": "2017-06-12T00:18:48Z"  
    },  
    "result": "",  
    "deviceId": "5",  
    "status": "SUCCESSFUL",  
    "startTime": "2019-09-10T21:12:29.501Z",  
    "endTime": "2019-09-10T21:13:30.102Z",  
    "col1": "INV0004",  
    "col2": "APIName1",  
    "col3": "9.007199254740991E15",  
    "col4": "API123@gmail.com",  
    "col5": "2017-06-12T00:18:48Z",  
    "deviceUserId": "0",  
    "queueId": "7",  
    "comment": "",  
    "automationId": "6",  
    "totalPausedTime": "0",  
    "error": "",  
    "col6": "",  
    "col7": "",  
    "col8": "",  
    "col9": "",  
    "col10": ""  
}
```

```
    ]
}
```

Response header:

```
cache-control: no-cache, no-store, max-age=0, must-revalidate
connection: keep-alive
content-security-policy: default-src 'self'
content-type: application/json
date: Tue, 24 Sep 2019 19:40:09 GMT
expires: 0
pragma: no-cache
transfer-encoding: chunked
x-content-type-options: nosniff
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block
```

## Create a work item in a queue

Use the Workload Management (WLM) API to add or insert data for work items in an existing queue in your Enterprise Control Room.

### Prerequisites

#### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

#### 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 [Enterprise Control Room API for Authentication](#).

- End point: `http://<your_control_room_url>/v2/wlm/queues/{id}/workitems`
- Method: POST

### Procedure

1. Add an authentication token to the request header.

Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.

2. Select the POST method.

3. In the URL, add the id for the queue you are adding the work item to.

In this example you are adding a work item to the queue with id=7:

```
http://<your_control_room_url>/v2/wlm/queues/7/workitems
```

4. Enter the following parameters in the request body.

Request body:

```
{  
  "workItems": [  
    {  
      "json": {  
        "Invoice Id": "INV909090",  
        "Customer Name": "John Doe",  
        "Amount": 100,  
        "email": "jdoe@wunderground.com",  
        "Invoice Date": "2019-01-10T00:18:48Z"  
      }  
    }  
  ]  
}
```

## Next steps

Response body:

```
{  
  "list": [  
    {  
      "id": "31363",  
      "createdBy": "25",  
      "createdOn": "2019-09-24T21:04:46.788Z",  
      "updatedBy": "25",  
      "updatedOn": "2019-09-24T21:04:46.788Z",  
      "version": "0",  
      "json": {  
        "Invoice Id": "INV909090",  
        "Customer Name": "John Doe",  
        "Amount": 100,  
        "email": "jdoe@wunderground.com",  
        "Invoice Date": "2019-01-10T00:18:48Z"  
      }  
    }  
  ]  
}
```

```

        },
        "result": "",
        "deviceId": "0",
        "status": "READY_TO_RUN",
        "col1": "INV909090",
        "col2": "John Doe",
        "col3": "100.0",
        "col4": "jdoe@wunderground.com",
        "col5": "2019-01-10T00:18:48Z",
        "deviceUserId": "0",
        "queueId": "0",
        "comment": "",
        "automationId": "0",
        "totalPausedTime": "0",
        "error": "",
        "col6": "",
        "col7": "",
        "col8": "",
        "col9": "",
        "col10": ""
    }
]
}

```

Response header:

```

cache-control: no-cache, no-store, max-age=0, must-revalidate
connection: keep-alive
content-length: 819
content-security-policy: default-src 'self'
content-type: application/json
date: Tue, 24 Sep 2019 21:05:05 GMT
expires: 0
pragma: no-cache
x-content-type-options: nosniff
x-frame-options: SAMEORIGIN
x-xss-protection: 1; mode=block

```

## Update work item data, results and status

Send a PUT request to update work item data, results and status.

### Prerequisites

#### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

#### 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 [Enterprise Control Room API for Authentication](#).

- URL: `http://<your_control_room_url>/v2/wlm/queues/{id}/workitems/{id}`
- Method: PUT

Note:

- 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.

Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.

2. Select PUT as the method.
3. In the URL, add the id for the queue and the work item you are updating.

URL example:

```
http://<your_control_room_url>/v2/wlm/queues/6/workitems/31365
```

4. Enter the following parameters in the request body.

Request body:

```
{
    "version": "0",
    "json": {
        "Invoice Id": "INV909090",
        "Customer Name": "John Doe",
        "Amount": 100,
        "email": "jdoe@wunderground.com",
        "Invoice Date": "2019-01-10T00:00:01Z"
    },
    "result": ""
```

```
        "status": "ON_HOLD"  
    }
```

## 5. Send the request.

- In a REST Client, click SEND.
- In the Swagger interface, click Execute.

Response body:

```
{  
    "id": 31365,  
    "createdBy": 25,  
    "createdOn": "2019-09-28T18:39:50.048Z",  
    "updatedby": 25,  
    "updatedOn": "2019-09-28T18:55:55.179Z",  
    "version": 1,  
    "json": {  
        "Invoice Id": "INV909090",  
        "Customer Name": "John Doe",  
        "Amount": 100.0,  
        "email": "jdoe@wunderground.com",  
        "Invoice Date": "2019-01-10T00:00:01Z"  
    },  
    "result": "",  
    "deviceId": 0,  
    "status": "ON_HOLD",  
    "col1": "INV909090",  
    "col2": "John Doe",  
    "col3": "100.0",  
    "col4": "jdoe@wunderground.com",  
    "col5": "2019-01-10T00:00:01Z",  
    "col6": "",  
    "col7": "",  
    "col8": "",  
    "col9": "",  
    "col10": "",  
    "deviceUserId": 0,  
    "queueId": 5,  
    "comment": ""},
```

```

    "automationId": 0,
    "totalPausedTime": 0,
    "error": ""
}

```

## Delete work items in a queue

Send a POST request from the WLM API to delete specific work items from specific queues.

## Prerequisites

### AAE\_Queue Admin role

You need a user account with the AAE\_Queue Admin role to query and manage workload queues and work items in an Enterprise Control Room.

### 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 [Enterprise Control Room API for Authentication](#).

- URL: `http://<your_control_room_url>/v2/wlm/queues/{id}/workitems/delete`
- Method: POST

Note:

- 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.

Note: Use the [Enterprise Control Room API for Authentication](#) to generate a JSON Web Token.

2. Select POST as the method.
3. In the URL, add the id for the queue you are deleting work items from.

URL example:

```
http://<your_control_room_url>/v2/wlm/queues/7/workitems/delete
```

4. Enter the following parameters in the request body.

Request body:

```
{ "workitemId": [ 313665 ] }
```

5. Send the request.
  - In a REST Client, click SEND.
  - In the Swagger interface, click Execute.

Response body:

OK

## API to export and import Bots for Bot Lifecycle Management

Use the export and import bots APIs to customize the organization's bot Lifecycle Management solution for an uninterrupted automation life-cycle.

Usually, the Enterprise Control Room user has to depend on means other than Enterprise Control Room (for example email) to deploy TaskBots from one environment to another. Using the Export-Import APIs, you can easily introduce a customized [Bot Lifecycle Management](#) (BLM) solution thus removing all external factors that could possibly disrupt your automation life cycle.

As a Enterprise Control Room user with Export bots and Download bots permission, you can export a bot and its dependent files. Similarly, as a user with Import bots and Upload bots permission, you can import that bot and its dependent files.

For example, you can move the bots that are verified as production ready from staging to production.

You can use the Enterprise Control Room Export Import REST API to manage your automation TaskBots including dependent files in different environments such as Development, Testing, Acceptance, and Production based on your organization's automation needs.

Refer Export bots and Import bots articles to use the functionality from your Enterprise Control Room user interface.

### Features and benefits

- Role based access control on [Bot Lifecycle Management](#)
- Automatic export of dependencies (files and bots)
- Audit and traceability on source and target environment for compliance
- Email notification on successful execution or failure of export and import.

### Export

- The Enterprise Control Room user whose credentials are used for authentication must have Export bots permission
- The Enterprise Control Room user whose credentials are used for authentication must have Download permission on the bots, minimum Execute permission on MetaBot, and dependencies that are being exported.
- If version control is enabled in the source Enterprise Control Room, the production version of all bots and dependencies which you want to export must be set.
- User account that is used to run the Enterprise Control Room services must have access to the location where package is getting exported, for example, network location(shared drive) or on Enterprise Control Room server machine.

## Import

- The Enterprise Control Room user whose credentials are used for authentication must have Import bots permission
- The Enterprise Control Room user whose credentials are used for authentication must have Upload permission on the bots and dependencies that are being imported.
- The Enterprise Control Room user who will execute the utility to import multiple bots must have access to the exported package file provided by Automation Anywhere.

## API Endpoints

- Export - <Enterprise Control Room URL>/v1/blm/export  
For example, <https://crdevenv.com:81/v1/alm/export>
- Import - <Enterprise Control Room URL>/v1/blm/import  
For example, <https://crtestenv.com:82/v1/alm/import>

Using the above end points of the BLM Export Import API you can export and import a single bot and all of its dependencies.

## Export Bot

Export a single bot with its dependent files using the Export API provided by Automation Anywhere:

1. Use the Post method to generate a token using the end point http(s)://<hostname:port>/v1/authentication. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example, <https://crdevenv.com:81/v1/authentication>

2. Use the Post method and state the parameters for credentials in Body Data. Refer sample:

```
{
  "username": "cradmin",
  "password": "cr@admin"
}
```

3. Click Play/Start.
4. BLM Export API will make use of 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.
5. Provide parameters such as filePath, destinationPath and packageName in Body Data to export a bot. Following list provides parameter description:
  - filePath - use this to specify the filepath ending with the name of the bot that you want to export
  - destinationPath - use this to specify the destination path where the exported package is to be stored

- packageName - use this to specify the package name that you want to assign to the exported package

Refer sample,

```
{
  "filePath": "Automation Anywhere\\My Tasks\\Finance\\Account Reconciliation.atmx",
  "destinationPath": "tempshare\\datashare\\Finance Department",
  "packageName": "Finance package"
}
```

6. Click Play/Start.

7. You can use multiple sources to view the export results in,

- Response Data that comprise packagePath and checksum.
- Audit Log page (landing page and details page)
- Email when you receive notification on success or failure, if configured

## Import Bot

After the bot is successfully exported to a network drive or Enterprise Control Room machine path, another authorized user can import that package to a different Enterprise Control Room using the Import API:

1. Use the Post method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. Provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example, <https://crtestenv.com:82/v1/authentication>

2. Use the Post method and state the parameters for credentials in Body Data.

Refer sample:

```
{
  "username": "cradmin2",
  "password": "cr@admin"
}
```

3. Click Play/Start.

4. BLM Import API will make use of 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.  
 5. After your credentials are authenticated, provide parameters such as package path and the checksum that was generated as a token during export in Body Data.

Refer sample:

```
{
```

```

"packagePath":"tempshare\\datashare\\Finance Department\\Finance
Package_20171221-154403.aapkg",
"checksum":"ZLyQ+Lbu2N+beEuXf6qd2Qi9uwi3BZxApn57C7mYjKQ="

}

```

Tip: You can copy the response of the BLM Export API and directly pass that as an input to the BLM Import API, if the package path is same and is accessible to the BLM Import API user.

## API Response Codes

Http(s) Status code	Response - Description	Corrective Action
200	Package created successfully	NA
400	Bad request parameter	Retry with valid parameters
404	File not found	Ensure that the file/bot is present in Enterprise Control Room
501	Permission error	Ensure that you have the Export/Import bots or Upload/Download permission

## Export and Import API utility

To export and import multiple bots you can use the utility provided by Automation Anywhere which comprises batch and jar files\*.

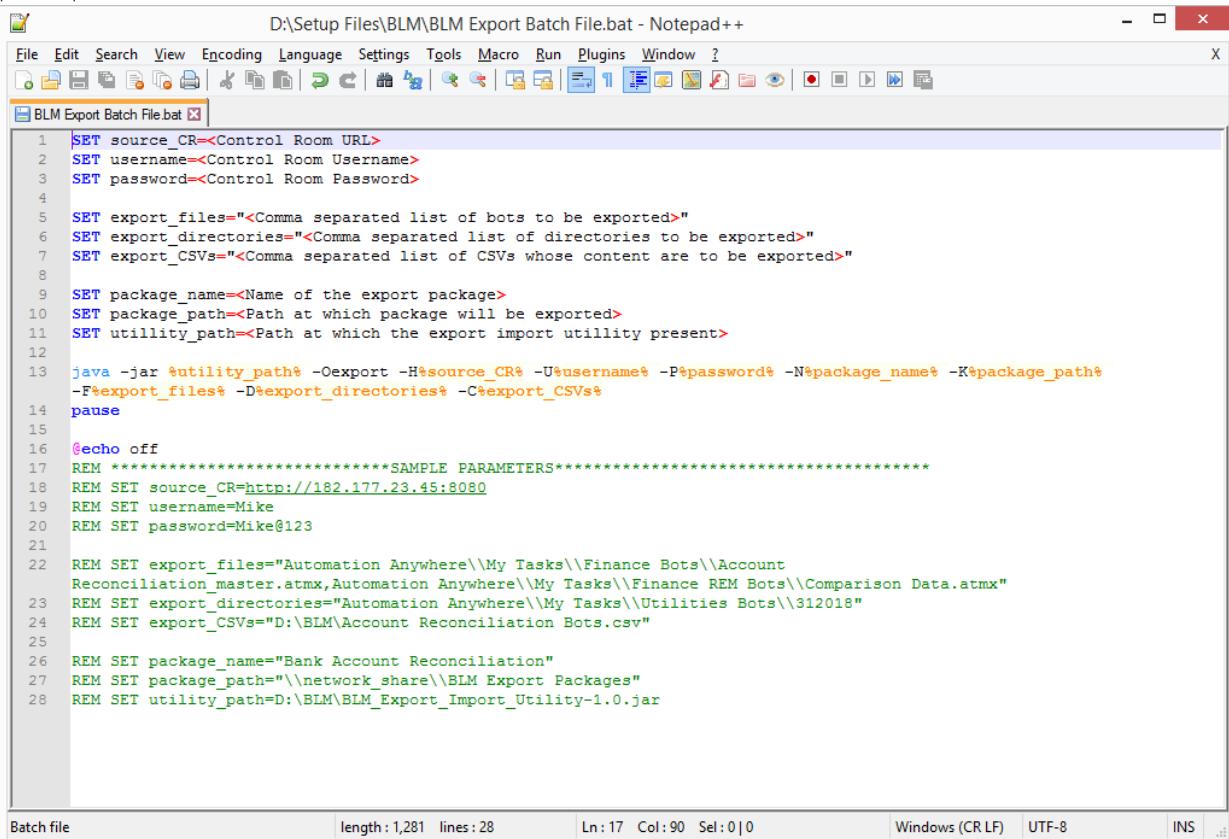
\*Java version 1.8 and above.

### Export Bots

You can export multiple Bots from a Enterprise Control Room repository using the Enterprise Control Room Bot Lifecycle Management Export utility. The method of using the batch file to export TaskBots from your Enterprise Control Room repository is explained here:

1. Open the BLM Export Batch File which comprises the API commands and parameters required to export bots from Enterprise Control Room. This file also provides sample parameters for ease of use.

Note: This utility uses the BLM Export API, behind the scenes for exporting multiple bots. Refer prerequisites.



```

D:\Setup Files\BLM\BLM Export Batch File.bat - Notepad++
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
Batch file length : 1,281 lines : 28 Ln : 17 Col : 90 Sel : 0 | 0 Windows (CR LF) UTF-8 INS : ...

1 SET source_CR=<Control Room URL>
2 SET username=<Control Room Username>
3 SET password=<Control Room Password>
4
5 SET export_files=<Comma separated list of bots to be exported>
6 SET export_directories=<Comma separated list of directories to be exported>
7 SET export_CSVs=<Comma separated list of CSVs whose content are to be exported>
8
9 SET package_name=<Name of the export package>
10 SET package_path=<Path at which package will be exported>
11 SET utility_path=<Path at which the export import utility present>
12
13 java -jar %utility_path% -Oexport -H%source_CR% -U$username% -P$password% -N%package_name% -K%package_path%
   -F%export_files% -D%export_directories% -C%export_CSVs%
14 pause
15
16 @echo off
17 REM *****SAMPLE PARAMETERS*****
18 REM SET source_CR=http://182.177.23.45:8080
19 REM SET username=Mike
20 REM SET password=Mike@123
21
22 REM SET export_files="Automation Anywhere\\My Tasks\\Finance Bots\\Account
   Reconciliation_master.atmx, Automation Anywhere\\My Tasks\\Finance REM Bots\\Comparison Data.atmx"
23 REM SET export_directories="Automation Anywhere\\My Tasks\\Utilities Bots\\312018"
24 REM SET export_CSVs="D:\\BLM\\Account Reconciliation Bots.csv"
25
26 REM SET package_name="Bank Account Reconciliation"
27 REM SET package_path="\\network_share\\BLM Export Packages"
28 REM SET utility_path=D:\\BLM\\BLM_Export_Import_Utility-1.0.jar

```

Tip: It is recommended that you create a copy of the batch file before you begin the export process.

2. You must now provide the following parameters in the file to export TaskBots and dependent files

- Enterprise Control Room instance as source\_CR parameter.

For example, <http://stagingCR-mydomain.com:8081/>

- Your Enterprise Control Room log in credentials as username and password parameters.

For example, username: Mike, password: Mike@123

- TaskBot file names as export\_files parameter. You can specify the bots/files separated by comma.

For example, Automation Anywhere\\My Tasks\\Finance Bots\\Account  
Reconciliation\_master.atmx, Automation Anywhere\\My Tasks\\Finance REM Bots\\Comparison  
Data.atmx

- TaskBot repository path name as export\_directories parameter. Use this if you want to export a large number of bots from folders.

For example, Automation Anywhere\\My Tasks\\Utilities Bots\\312018, Automation Anywhere\\My  
Tasks\\Sample Tasks\\Analytics Tasks

- CSV file name(s) with its path as export\_CSVs parameter. Use this if you want to export bots/files from external .csv/.txt file.

- You can combine filenames, directories and .csv files to export multiple files from multiple sources.

For example, Automation Anywhere\My Tasks\Finance\Bank Account Reconciliation.atmx, Automation Anywhere\My Tasks\Banking\Audit Certification Generation.atmx, Automation Anywhere\My MetaBots\Import Customer Data.mbot, Automation Anywhere\My Docs\daily sales data.xlsx

- You should pass minimum one parameter and leave the values blank for the ones that are not required.

For example, SET export\_CSVs=""

- Name of the package as package\_name parameter. This file is saved as a compressed file that will be used for importing the bots to another Enterprise Control Room instance.

For example, Bank Account Reconciliation

- Destination path of the package as package\_path parameter.

Note: This can be either a shared drive or the Enterprise Control Room machine path for which the Enterprise Control Room service user should have write permission.

For example\\network\_share\BLM Export Packages

3. Run the batch file to launch the export command.
4. Verify the package is created in the location specified as package\_path parameter.

This package will be used by the Enterprise Control Room user for importing the bots to another instance of Enterprise Control Room.

## Sample Code

```
SET source_CR=<Enterprise Control Room URL>
```

```
SET username=<Enterprise Control Room Username>
```

```
SET password=<Enterprise Control Room Password>
```

```
SET export_files=<Comma separated list of bots to be exported>"
```

```
SET export_directories=<Comma separated list of directories to be exported>"
```

```
SET export_CSVs=<Comma separated list of CSVs whose content are to be exported>"
```

```
SET package_name=<Name of the export package>
```

```
SET package_path=<Path at which package will be exported>
```

```
java -jar %utility_path% -Oexport -H%source_CR% -U%username% -P%password% -N%package_name% -K%package_path% -F%export_files% -D%package_path% -C%export_CSVs%
```

```
pause
```

```
@echo off
```

```
REM *****SAMPLE PARAMETERS*****
```

```
REM SET source_CR=http://123.456.78.90:8080
```

```
REM SET username=Mike
```

```
REM SET password=Mike@123
```

```
REM SET export_files="Automation Anywhere\\My Tasks\\Finance Bots\\Account Reconciliation_master.atmx, Automation Anywhere\\My Tasks\\Finance REM Bots\\Comparison Data.atmx"
```

```
REM SET export_directories="Automation Anywhere\\My Tasks\\Utilities Bots\\312018"
```

```
REM SET export_CSVs="D:\\BLM\\Account Reconciliation Bots.csv"
```

```
REM SET package_name=Bank Account Reconciliation
```

```
REM SET package_path=\\\\\\network_share\\BLM Export Packages
```

```
REM SET utility_path=D:\\BLM\\BLM_Export_Import.Utility-1.0.jar
```

## Import Bots

You can import multiple bots to a Enterprise Control Room repository using the Enterprise Control Room Bot Lifecycle Management Import utility. The method of using the batch file to import TaskBots to your Enterprise Control Room repository is explained here:

1. Open the BLM Import Batch File which comprises the API commands and parameters required to import bots to Enterprise Control Room. This file also provides sample parameters for ease of use.  
Tip: It is recommended that you create a copy of the batch file before you begin the import process.
2. You must now provide the following parameters in the file to import TaskBots and dependent files:
  - a) The target Enterprise Control Room instance as target\_CR parameter.

For example, <http://prodCR-mydomain.com:80/>

b) Your Enterprise Control Room login credentials as username and password parameters.

For example, username: John.Smith, password: John@123

c) Absolute path name of the export package as package\_path parameter.

For example, \\\network\_share\\BLM Export Packages

3. Run the batch file to launch the import command.
4. You can verify the bots are imported in the Enterprise Control Room bots repository from the list of bots/files that are exported or imported in BLM Logs.log file. This file is saved in the same folder as the utility (.jar file).

## Sample Code

```
SET target_CR=<Target Enterprise Control Room URL>
```

```
SET username=<Enterprise Control Room Username>
```

```
SET password=<Enterprise Control Room Password>
SET package_path=<Absolute path of the export package>
java -jar %utility_path% -Oimport -S%package_path% -U%username% -P%password% -H%target_CR%
pause
@echo off
REM *****SAMPLE PARAMETERS*****
REM SET target_CR=http://987.654.32.10:8080
REM SET username=John
REM SET password=John@123
REM SET package_path=\\\network_share\BLM Export Packages
REM SET utility_path=D:\BLM\BLM_Export_Import_Utility-1.0.jar
```

## Audit Logs

An audit entry is logged in the Enterprise Control Room Audit Log page when you export or import bots.

Related concepts

[Audit log overview](#)

Related reference

[Bot Lifecycle Management \(BLM\) - an overview](#)

[Export bots](#)

[Import bots](#)

## APIs to manage credential vault

As a Enterprise Control Room user with Manage my credentials and lockers role permissions, use the Credential Vault APIs to manage your Credentials, Attributes, Lockers, and Credential Vault mode in the Enterprise Control Room.

1. The [APIs to manage credentials](#) can be used to create, update, and delete credentials
2. The [APIs to manage credential attributes](#) can be used to create, update, and delete the credential attributes and values.
3. The [APIs to manage lockers](#) can be used to add, edit, and remove lockers including consumers and members
4. The [APIs to manage credential vault mode](#) can be used to configure the Connection mode that allows you to connect to the Credential Vault using a Master key.

Note: The examples provided in this article are for reference only.

## API end point

Use the following end point to access the Credential Vault APIs: <Enterprise Control Room URL>/v2/credentialvault

For example, <https://crdevenv.com:81/v2/credentialvault>

## APIs to manage credentials

Use these APIs to manage your Credentials in the Enterprise Control Room.

Before accessing the Credential Vault API's you must first use the authentication API and pass it as a token to use a particular Credential Vault API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example, <https://crdevenv.com:81/v1/authentication>

2. Provide the following request payload in Headers

```
"X-Authorization" : "Authorization token"
"Content-Type" : "application/json"
```

3. Provide the following request payload in Body:

```
{
  "username": "<Username>",
  "password": "<Password>"
}
```

For example, {

```
"username": "Ellie.Brown",
"password": "12345678"
}
```

### 1. Create Credential

This API allows you to create a credential.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "name": "<Credential Name>",
  "description": "<Credential Description>","attributes":
  [
    {
      "name": "<Attribute Name>",
      "description": "<Attribute Description>",
      "userProvided": <true or false>,
      "masked": <true or false>
    }
  ]
}
```

For example, the following creates a Credential "SharePoint Login" with "Username" as an attribute:

```
{
  "name": "SharePoint Login",
  "description": "Credentials to login to SharePoint",
  "attributes":
  [
    {
      "name": "Username",
      "description": "Name of the user",
      "userProvided": true,
      "masked": true
    }
  ]
}
```

3. Click Send.
4. The action is successful when the response status is 201 Credential created.
5. You can view the response in the Body data.

```
{
  "id": "10",
  "name": "SharePoint Login",
```

```
"description": "Credentials to login to SharePoint",  
  
"ownerId": "1",  
  
"attributes": [  
  
    {  
  
        "id": "58",  
  
        "name": "Username",  
  
        "description": "Name of the user",  
  
        "userProvided": true,  
  
        "masked": true,  
  
        "createdBy": "1",  
  
        "createdOn": "2018-07-16T06:04:32.905Z",  
  
        "updatedBy": "1",  
  
        "updatedOn": "2018-07-16T06:04:32.905Z",  
  
        "version": "0"  
  
    }  
  
,  
  
    {"createdBy": "1",  
  
     "createdOn": "2018-07-16T06:04:32.905Z",
```

```

    "updatedBy": "1",
    "updatedOn": "2018-07-16T06:04:32.905Z",
    "version": "0"
}

```

## Parameter description

Parameter	Description
name	Credential name in the first instance and Attribute name in the second instance
description	Credential description in the first instance and Attribute value description in second instance
userProvided	Whether the Attribute type is User-provided or Standard. If User-provided, this is set to true which is also the default parameter. For details on Attribute value types, see <a href="#">Create a credential</a> .
masked	Whether the Attribute value is Masked. This is set to true if it is encrypted. For details see Create a credential.

## 2. List of credentials

This API allows you to view all credentials where a user is an owner or has access through a locker. If the user is a locker admin, it lists all credentials in the system.

1. Provide the "X-Authorization" parameter in Headers.
2. Use the GET method to access the Credential APIs with the following parameters: http(s)://<hostname:port>/v2/credentialvault/credentials?consumed=<true or false>&name or names=<filter credentials name(s) separated by comma>"

For example, the following lists all Credentials that are not consumed:

<https://crdevenv.com:81/v2/credentialvault/credentials?consumed=false>

3. Click Send
4. The action is successful when the response status is 200 Found credentials
5. You can view the response in Body data:

```

{
  "list": [
    {
      "id": 12,
      "createdBy": 1,
      "createdOn": "2018-06-25T14:13:58+05:30",
      "upd

```

```

atedBy": 1,
"updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "na
me":
"SharePoint Login", "description": "-", "lockerId": null, "ownerId": 1, "a
ttributes":
[ { "id": 61, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30",
"updatedBy": 1, "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, " "
version": 0,
"name": "Username", "description": "-", "userProvided": true, "masked": t
rue } ], "completed": false },
{ "id": 11, "createdBy": 1, "createdOn": "2018-06-21T12:56:07+05:30", "upd
atedBy": 1,
"updatedOn": "2018-06-21T13:00:22+05:30", "tenantId": 1, "version": 1, "na
me":
"SharePoint-User1", "description": "name of the SharePoint user", "lockerI
d": null,
"ownerId": 1, "attributes": [ { "id": 59, "createdBy": 1, "createdOn": "20
18-06-21T12:56:07+05:30",
"updatedBy": 1, "updatedOn": "2018-06-21T13:00:22+05:30", "tenantId": 1, " "
version": 1,
"name": "SP-User1", "description": "name of the user",
"userProvided": true, "masked": false }, { "id": 60, "createdBy": 1, "crea
tedOn":
"2018-06-21T13:00:22+05:30", "updatedBy": 1, "updatedOn": "2018-06-21T13:0
0:22+05:30",
"tenantId": 1, "version": 0, "name": "Victor.Hugo", "description": null, " "
userProvided": true, "masked": false }
],
"completed": false
]
}

```

## Parameter Description

Parameter	Description
consumed	Filters credentials by fact if credential is userProvided and consumed by current user.

Parameter	Description
name	Filters credentials by a single name.
names	Filters credentials by comma separated list of names.

### 3. List credential by id

This API allows you to view details of the credentials whose id you provide as a parameter.

Tip: You can identify the Id of a credential from the list of credentials that were fetched using the List Credentials API.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the GET method to access the Credential APIs with the following parameters: http(s)://<hostname:port>/v2/credentialvault/credentials/<id>

For example, the following fetches a user credential that has the id 12: https://crdevenv.com:81/v2/credentialvault/credentials/12

3. Click Send.

The action is successful when the response status is 200. You can view the response in Body data:

```
{
  "id": 12, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1,
  "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name":
  "SharePoint Login", "description": "-", "lockerId": null, "ownerId": 1,
  "attributes":
  [
    {
      "id": 61, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1,
      "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name": "Username",
      "description": "-", "userProvided": true, "masked": true
    }
  ]
}
```

### 4. Update credential

This API allows you to update existing credentials.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use PUT method to access the Credential APIs

```
http(s)://<hostname:port>/v2/credentialvault/credentials/<id>
```

For example, the following updates the credential with Id 12 :

```
https://crdevenv.com:81/v2/credentialvault/credentials/12
```

3. Provide the following request payload in Body:

```
{
  "id": "<Credential id>", "version": <Version id>, "name": "<Credential Name>", "description":
    "<Credential Description>", "lockerId": null, "ownerId": <the user ID of the owner>,
  "attributes":
  [
    { "id": <Attribute id>, "version": 0, "name": "<Updated attribute name >" ,
      "description":
        "<Updated attribute description>", "userProvided": <False or true>, - Attribute type "masked":
          <false or true> masking is true or false }
  ]
}
```

For example, if you want to update the Credential Description, you can provide following request parameters:

```
{
  "id": "12", "version": 0, "name": "SharePoint Login", "description": "Login details for SharePoint",
  "lockerId": null, "ownerId": <the user ID of the owner>,
  "attributes":
  [
    { "id": 61, "version": 0, "name": "<Updated attribute name >", "description": "SharePoint Username",
      "userProvided": <False or true>, - Attribute type "masked": true
    }
  ]
}
```

Tip: You can input only those parameters that you want to update and keep the other parameter values intact; that is, make no change.

4. Click Send.
5. The action is successful when the response status is 200 Credential updated.
6. You can view the response in Body data:

```
{
  "id": 12, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1, "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name": "SharePoint Login", "description": "Login details for SharePoint", "lockerId": null, "ownerId": 1, "attributes": [
    {
      "id": 61, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1, "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name": "Username", "description": "SharePoint Username", "userProvided": true, "masked": true }
  ]
}
```

## Parameter description

Parameter	Description
id	Credential id in the first instance and Attribute id in the second instance. This can be identified by using the Get Credential by Id API
version	Updated version id of Credential in the first instance and Attribute in the second instance. In case of discrepancy in earlier and current version, the conflict error is shown
name	Updated Credential in the first instance and Attribute value in the second instance
description	Updated Credential description in the first instance and Attribute value description in second instance
lockerId	Locker id if available. If no locker id is provided this is set to null which is a default value. This can be identified by using the Get Credential by Id API
ownerId	The user id of the credential owner. This can be identified by using the Get Credential by Id API
userProvided	Whether the Attribute type is User-provided or Standard. If User-provided, this is set to true which is also the default parameter. For details on Attribute value types, refer Create a credential.

Parameter	Description
masked	Whether the Attribute value is Masked. This is set to true if it is encrypted. For details refer Create a credential.

## 5. Update ownership of credential

This API allows you to update ownership of the credential.

1. Provide the "X-Authorization" parameters in Headers.
2. Use PUT method to access the Credential APIs

`http(s)://<hostname:port>/v2/credentialvault/credentials/<id>/owner/<credentialOwnerId>`

For example, the following changes the ownership of credential with Id 12 from owner 1 to 2

`https://crdevenv.com:81/v2/credentialvault/credentials/12/owner/2`

3. Click Send
4. The action is successful when the response status is 200 Successful update of credential ownership .
5. You can view the response in Body data:

```
{
  "id": 12, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1, "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name": "SharePoint Login", "description": "Login details for SharePoint", "lockerId": null, "ownerId": 1,
  "attributes": [
    {
      "id": 61, "createdBy": 1, "createdOn": "2018-06-25T14:13:58+05:30", "updatedBy": 1, "updatedOn": "2018-06-25T14:13:58+05:30", "tenantId": 1, "version": 0, "name": "Username", "description": "SharePoint Username", "userProvided": true, "masked": true
    }
  ]
}
```

## Parameter Description

Parameter	Description
id	Id of the Credential. This can be identified by using the Get Credential by Id API
credentialOwnerId	Id of the new Credential owner. This can be identified by using the Get Credential by Id API

## 6. Delete credentials

This API allows you to delete the credential whose id you provide as a parameter

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to access the Credential APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/credentials/<id>`

For example, the following deleted the credential that has Id 11

`https://crdevenv.com:81/v2/credentialvault/credentials/11`

3. Click Send.

The action is successful when the response status is 204 Successful Delete .

## APIs to manage credential attributes

As a Enterprise Control Room user with View and edit ALL credentials attributes value use the Credential Attribute APIs to manage your Credential Attributes and its Values in the Enterprise Control Room. Thus with this API, create, edit, and remove attribute values of user created credentials.

Before accessing the Credential Vault APIs you must first use the authentication API and pass it as a token to use a particular Credential Vault API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example,`https://crdevenv.com:81/v1/authentication`

2. Use the POST method to access the Credential APIs

For example, GET `https://crdevenv.com:81/v2/credentialvault/credentials`

3. Provide the following request payload in Headers

`"X-Authorization" : "Authorization token"`

`"Content-Type" : "application/json"`

## 1. Create attribute value

This API allows you to create attribute value of a credential whose id you provide as a parameter

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to access the Credential APIs :

`http(s)://<hostname:port>/v2/credentialvault/credentials/<id>/attributevalue`

For example, the following creates an attribute username for the credential Id 12

`https://crdevenv.com:81/v2/credentialvault/credentials/12/username`

3. Provide the request payload in Body:

```
[ { "credentialAttributeId":  
    "<Attribute Id>", "value": "<attribute value>" }  
]
```

For example, for the Credential "SharePoint Login" that was created in the earlier example with Id "12", for the Attribute "username" with Id "30" you can add the value as shown:

```
[  
{  
  "credentialAttributeId": "30",  
  "value": "Jane.Smith"  
}  
]
```

4. Click Send
5. The action is successful when the response status is 201 Credential attribute values created
6. You can view the response in Body data:

```
[  
{  
  "id":30,"createdBy":1,"createdOn":"2018-06-27T14:18:13+05:30","updatedBy":  
1,"updatedOn":"2018-06-27T14:18:13+05:30","tenantId":1,"version":  
0,"userId":null,"value":"Jane.Smith","credentialAttributeId":62  
}  
]
```

Parameter description

Parameter	Description
credentialAttributeId	Id of the Attribute. This can be identified by using the Get Credential by Id API
value	Attribute value that you want to provide

## 2. List of credential attribute values

This API allows you to list all standard and user specified values for a specific credential.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to access the Credential APIs with the following parameters:

---

`http(s)://<hostname:port>/v2/credentialvault/credentials/<id>/attributevalues`

For example, for the credential "SharePoint Login" with Id "12" for the Attribute "username" with Id "30" you can add the value as shown:

`https://crdevenv.com:81/v2/credentialvault/credentials/12/attributevalues`

3. Click Send.

The action is successful when the response status is 200 Credential attribute values found

4. You can view the response in Body data:

```
{ "list": [
  {
    "id": 30, "createdBy": 1, "createdOn": "2018-06-27T14:16:20+05:30", "updatedBy": 1, "updatedOn": "2018-06-27T14:16:20+05:30", "tenantId": 1, "version": 0, "userId": null, "value": "Jane.Smith", "credentialAttributeld": 62
  }
]}
```

Parameter description

Parameter	Description
<code>id</code>	Id of the Credential. This can be identified by using the Get Credential by Id API
<code>credentialAttributeld</code>	Id of the Attribute. This can be identified by using the Get Credential by Id API
<code>userId</code>	Id of the Enterprise Control Room user

### 3. Update credential attribute value

This API allows you to update the value of an attribute of the specified credential.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the PUT method to access the Credential APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault//credentials/<id>/attributevalues/<attributeValueId>`

For example, for the credential "SharePoint Login" with Id "12" for Attribute "username" with Id "30" you can update the value as shown:

`https://crdevenv.com:81/v2/credentialvault/credentials/12/attributevalues/30`

3. Provide the request payload in Body:

[

```
{
  "id": "<Attribute value id>", "version": 0, "value": "<Attribute value>", "credentialAttributeld": "<Attribute ID>"
}
]
```

4. Click Send.

The action is successful when the response status is 200 Credential attribute value updated.

5. You can view the response in Body data:

```
[
{
  "id":30,"createdBy":1,"createdOn":"2018-06-27T14:47:55+05:30","updatedBy":1,"updatedOn":"2018-06-27T14:47:55+05:30","tenantId":1,"version":0,"userId":null,"value":"","credentialAttributeld":62
}
]
```

#### Parameter Description

Parameter	Description
id	Id of the Attribute Value. This can be identified by using the Get Credential by Id API
version	Version number of the updated Attribute Value
credentialAttributeld	Id of the Attribute. This can be identified by using the Get Credential by Id API

## Delete credential attribute value

This API allows you to delete the attribute value of a specific credential

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to delete the credential attribute value using the Credential APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/credentials/<id>/values/<attributeValueId>`

For example, `https://crdevenv.com:81/v2/credentialvault/credentials/12/values/30`

3. Click Send
4. The action is successful when the response status is 204 Successful Delete

## APIs to manage lockers

As a Enterprise Control Room admin with Administer all lockers permission or a Enterprise Control Room user with Manage my lockers permission, use the Manage Locker APIs to create, update, and delete Lockers, Consumers, and Members in the Enterprise Control Room.

Before accessing these API's you must first use the authentication API and pass it as a token to use a particular Credential Vault API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example,`https://crdevenv.com:81/v1/authentication`

2. Use the POST method to access the Credential APIs

For example, GET `https://crdevenv.com:81/v2/credentialvault/lockers`

3. Provide the following request payload in Headers

`"X-Authorization" : "Authorization token"`

`"Content-Type" : "application/json"`

### 1. List of lockers

This API fetches list of the lockers for which the logged on user is a member (owner, manager or participant) or has usage permission. If the user is locker admin, it fetches the list of all lockers in the system.

1. Provide the `"X-Authorization"` parameter in Headers.
2. Use the GET method to access the Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers?consumed=<true or false>"`

For example,the following lists all locker names that are not consumed:

`https://crdevenv.com:81/v2/credentialvault/lockers?consumed=false`

3. Click Send.
4. The action is successful when the response status is 200 Lockers found
5. You can view the response in Body data:

```
{
  "list": [
    {
      "id": 2,
      "name": "SharePoint Locker",
      "description": "",
      "createdBy": 2,
      "createdOn": "2018-07-04T09:40:49.187Z",
      "updatedBy": 2,
      "updatedOn": "2018-07-04T09:41:04.682Z",
      "tenantId": 1,
      "version": 1
    }
  ]
}
```

```

},
{
  "id": 3, "name": "Outlook Locker", "description": "", "createdBy": 2, "createdOn": "2018-07-04T09:47:33.532Z", "updatedBy": 2, "updatedOn": "2018-07-04T09:47:33.532Z", "tenantId": 1, "version": 0
}
]}

```

Parameter description

Parameter	Description
id	Locker id
name	Name of the locker
description	Description that is given for the locker
consumed	Whether consumed by logged in user. This could be either True or False

## 2. Create a locker

This API allows you to create a locker.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to access the Locker APIs :

```
http(s)://<hostname:port>/v2/credentialvault/credentials/<id>/attributevalue
```

- For example, the following creates an attribute username for the credential Id 12  
`https://crdevenv.com:81/v2/credentialvault/credentials/12/username`

3. Provide the request payload in Body:

```
{
  "name": "<Locker name>" ,
  "description": "<Locker description>"
}
```

- For example, the following creates a "SalesForce" locker:

```
{
  "name": "SalesForce Locker", "description": "Use this to store all credentials for the SalesForce application"
}
```

4. Click Send.
5. The action is successful when the response status is 201 Locker created
6. You can view the response in Body data:

```
{
  "id": 4, "name": "SalesForce Locker", "description": "Use this to store all credentials for the SalesForce application", "createdBy": 2, "createdOn": "2018-07-04T09:55:04.045Z", "updatedBy": 2,
  "updatedOn": "2018-07-04T09:55:04.045Z", "tenantId": 1, "version": 0
}
```

#### Parameter Description

Parameter	Description
name	Name of the locker as provided by the Locker admin
description	Description of the locker

### 3. List of all lockers with additional fields included

This API fetches list of the lockers for which the logged on user is a member (owner, manager or participant) or has usage permission. If the user is locker admin, it fetches the list of all lockers in the system. The response includes locker members and count of credentials inside each locker.

1. Provide the "X-Authorization" parameter in Headers.
2. Use the GET method to access the Locker APIs with the following parameters:

[http\(s\)://<hostname:port>/v2/credentialvault/lockers/advanced](http://<hostname:port>/v2/credentialvault/lockers/advanced)

- For example, the following lists all locker names with additional fields

<https://crdevenv.com:81/v2/credentialvault/lockers/advanced>

3. Click Send.
4. The action is successful when the response status is 200 Lockers found
5. You can view the response in Body data:

```
{ "list": [
```

```

{ "id": 2, "name": "SharePoint Locker", "description": "", "createdBy": 2, "createdOn": "2018-07-04T09:40:49.187Z", "updatedBy": 2, "updatedOn": "2018-07-04T10:10:04.163Z", "tenantId": 1, "version": 2, "members": [ { "id": 1, "permissions": [ "participate", "manage" ] }, { "id": 2, "permissions": [ "participate", "own", "manage" ] } ], "countOfCredentials": 1 }

{ "id": 3, "name": "Outlook Locker", "description": "", "createdBy": 2, "createdOn": "2018-07-04T09:47:33.532Z", "updatedBy": 2, "updatedOn": "2018-07-04T09:47:33.532Z", "tenantId": 1, "version": 0, "members": [ { "id": 2, "permissions": [ "participate", "own", "manage" ] } ], "countOfCredentials": 0 }

{ "id": 4, "name": "SalesForce Locker", "description": "-", "createdBy": 2, "createdOn": "2018-07-04T09:55:04.045Z", "updatedBy": 2, "updatedOn": "2018-07-04T09:55:04.045Z", "tenantId": 1, "version": 0, "members": [ { "id": 2, "permissions": [ "participate", "own", "manage" ] } ], "countOfCredentials": 0 }

}

```

## 4. List locker by id

This API allows you to fetch locker details based on its Id.

Tip: You can identify the Id of a locker from the list of lockers that were fetched using the List Lockers API.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the GET method to access the Credential APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<id>`

- For example, the following fetches a locker that has the id 2:

`https://crdevenv.com:81/v2/credentialvault/lockers/2`

3. Click send
4. The action is successful when the response status is 200 Locker .
5. You can view the response in Body data:

```

{
  "id": 2, "name": "SharePoint Locker", "description": "", "createdBy": 2, "createdOn": "2018-07-04T09:40:49.187Z", "updatedBy": 2, "updatedOn": "2018-07-04T10:10:04.163Z", "tenantId": 1, "version": 2
}

```

## 5. Update locker

This API allows you to update the values of a specific locker

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the PUT method to access the Credential APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault//lockers/<id>`

- For example, for the locker "SharePoint Locker" with Id"2" you can update the value as shown:

---

<https://crdevenv.com:81/v2/credentialvault/lockers/2>

3. Provide the request payload in Body:

```
{
  "id": "<locker id>", "name": "<updated lockername>", "description": "<updated description>", "version": 0
}
```

4. Click Send
5. The action is successful when the response status is 200 Locker updated
6. You can view the response in Body data:

```
{
  "id": 2, "createdBy": 8, "createdOn": "2018-06-16T10:59:33Z", "updatedBy": 8, "updatedOn": "2018-06-16T10:59:37Z", "version": 1, "name": "SharePoint-Locker", "description": "Locker to manage SharePoint credentials"
}
```

#### Parameter Description

Parameter	Description
id	Id of the locker. This can be identified by using the Get Locker by Id API
version	Version number of the updated locker value
name	Updated name of the locker
description	Updated description of the locker

## 6. Delete locker

This API allows you to delete the locker whose id you provide as a parameter

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to remove the credentials of a locker using Locker APIs with the following parameters:

[http\(s\)://<hostname:port>/v2/credentialvault/lockers/<id>](http(s)://<hostname:port>/v2/credentialvault/lockers/<id>)

- For example, the following deletes the credential that has Id 4

<https://crdevenv.com:81/v2/credentialvault/lockers/4>

3. Click Send
4. The action is successful when the response status is 204 Successful Delete

## 7. List all locker consumers

This API allows you to fetch the list of roles that can use credentials in the locker

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to access the Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<id>/consumers`

- For example, the following fetches the roles that can use credentials from the locker with Id 2

`https://crdevenv.com:81/v2/credentialvault/lockers/2/consumers`

3. Click Send
4. The action is successful when the response status is 204 Successful
5. You can view the response in the Body data:

```
{
  "list": [
    {
      "id": "14"
    }
  ]
}
```

## 8. Add locker consumers

This API allows you to add a consumer to the specified locker

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the PUT method to access the Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<id>/consumers`

- For example, the following allows you to connect to the locker with Id 2 wherein you want to add the role with consumer id 14

`https://crdevenv.com:81/v2/credentialvault/lockers/2`

3. Provide the request payload in Body:

```
{
  "id": "<consumer id>"
}
```

- For example,

```
{
  "id": 14
}
```

4. Click Send
5. The action is successful when the response status is 204 Successful creation of locker consumer

#### Parameter Description

Parameter	Description
id	Id of the locker consumer. This can be identified by using the Get Locker by Id API

## 9. Remove locker consumers

This API allows you to remove consumers from the specified locker

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to remove a locker consumer using Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/consumers/<roleId>`

- For example, the following deletes the credential that has Id 2

`https://crdevenv.com:81/v2/credentialvault/lockers/2/consumers/14`

3. Click send
4. The action is successful when the response status is 204 Successful Delete .

## 10. List all locker members

This API allows you to fetch the list of all users that can add/remove credentials from the specified locker or edit the locker settings.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to access the Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/members`

- For example, the following fetches the users that can add/remove user from the locker with Id 2

`https://crdevenv.com:81/v2/credentialvault/lockers/2/members`

3. Click Send
4. The action is successful when the response status is 200 Locker Members
5. You can view the response in the Body data:

```
{
```

```
"list":
```

```
[
```

```
{
```

```

    "id": 1, "permissions": [ "participate", "manage" ]

},
{
    "id": 2, "permissions": [ "participate", "own", "manage" ]

}
]
}

```

## 11. Add or update locker member

This API allows you to add a user who can add/remove credentials from the locker or edit the locker settings.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the PUT method to add/update user using Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/members/<userId>`

- For example, the following allows you to connect to the locker with Id 2 wherein you want to add the user with member id 3

`https://crdevenv.com:81/v2/credentialvault/lockers/2/members/3`

3. Provide the request payload in Body:

```

{
    "permissions": [
        "permission type"
    ]
}
```

- For example,

```

{
    "permissions": [
        "participate", "manage"
    ]
}
```

4. Click Send

5. The action is successful when the response status is 204 Successful creation/update of locker member

### Parameter Description

Parameter	Description
permissions	Permission that the user is granted. It can be own, participate and/or manager.

## 12. Remove locker member

This API allows you to remove locker users or members from the specified locker

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to remove a locker consumer using Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/members/<userId>`

- For example, the following deletes the locker user that has Id 3

`https://crdevenv.com:81/v2/credentialvault/lockers/2/members/3`

3. Click Send
4. The action is successful when the response status is 204 Successful removal of locker member

## 13. Add credential to a locker

This API allows you to add your own credential to a locker where you have owner, manage or participant permissions.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the PUT method to add credentials to a locker using the Credentials API with following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/credentials/<credentialId>`

- For example, the following adds a credential to the locker with Id 2`https://crdevenv.com:81/v2/credentialvault/lockers/2/credentials/58`

3. Click Send
4. The action is successful when the response status is 200 Credential has been added to the locker .

## 14. List all locker credentials

This API allows you to fetch the list of credentials in a locker for which you have owner, manage or participant permissions.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch the list of credentials using the Credentials API with following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/credentials/`

- For example, the following lists all credentials that are added to the locker with Id 2

`https://crdevenv.com:81/v2/credentialvault/lockers/2/credentials/`

3. Click Send
4. The action is successful when the response status is 200 Locker credentials

- 
5. You can view the response in the Body data:

```
{
  "list": [
    {
      "id": 10, "name": "SharePoint Credentials", "description": "", "completed": false, "lockerId": 2, "ownerId": 2,
      "attributes": [
        {
          "id": 58, "name": "username", "description": "", "userProvided": true, "masked": false, "createdBy": 2,
          "createdOn": "2018-07-04T10:09:32.854Z", "updatedBy": 2, "updatedOn": "2018-07-04T10:09:32.854Z",
          "tenantId": 1, "version": 0
        },
        {
          "id": 59, "name": "password", "description": "", "userProvided": true, "masked": true, "createdBy": 2,
          "createdOn": "2018-07-04T10:09:32.854Z", "updatedBy": 2, "updatedOn": "2018-07-04T10:09:32.854Z",
          "tenantId": 1, "version": 0
        }
      ],
      "createdBy": 2, "createdOn": "2018-07-04T10:09:32.854Z", "updatedBy": 2, "updatedOn": "2018-07-04T10:10:04.316Z",
      "tenantId": 1, "version": 1
    }
  ]
}
```

## 15. Remove credential from a locker

This API allows you to remove locker users or members from the specified locker

1. Provide the "X-Authorization" parameters in Headers.
2. Use the DELETE method to remove a locker consumer using Locker APIs with the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/lockers/<lockerId>/credentials/<credentialId>`

- For example, the following deletes the credential with Id 59 from the locker with Id 2

`https://crdevenv.com:81/v2/credentialvault/lockers/2/credentials/59`

3. Click Send
4. The action is successful when the response status is 204 redential has been removed from the locker

## APIs to manage credential vault mode

As a Enterprise Control Room admin with View and mange settings permission, use the Manage Credential Vault mode APIs to manage the Credential Vault mode of the Enterprise Control Room.

Before accessing these API's you must first use the authentication API and pass it as a token to use a particular Credential Vault API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example,<https://crdevenv.com:81/v1/authentication>

2. Use the POST method to access the Credential APIs

For example, GET <https://crdevenv.com:81/v2/credentialvault/lockers>

3. Provide the following request payload in Headers

`"X-Authorization" : "Authorization token"`

`"Content-Type" : "application/json"`

## View current credential vault mode

This API allows you to view the current mode used to connect to the Credential Vault. This can either be "Express" or "Manual"

1. Provide the "X-Authorization" parameters in Headers.
2. Use GET method to access the Credential Vault API's using the following parameters:  
`http(s)://<hostname:port>/v2/credentialvault/mode`
  - For example, the following displays the current mode used to connect to the Credential Vault:  
<https://crdevenv.com:81/v2/credentialvault/mode>
3. Click Send/Execute
4. The action is successful when the response status is 200 CV Mode has been successfully received
5. You can view the response in the Body data:

```
{
```

```
  "name": "Express"
```

```
}
```

## Update Credential Vault mode

This API allows you to change the mode used to connect to the Credential Vault. This can either be "Express" or "Manual"

1. Provide the "X-Authorization" parameters in Headers.
2. Use PUT method to access the Credential Vault API's using the following parameters:  
http(s)://<hostname:port>/v2/credentialvault/mode

- For example, the following displays the current mode used to connect to the Credential Vault:

<https://crdevenv.com:81/v2/credentialvault/mode>

3. Provide the request payload in the Body:

```
{
  "name": "<mode>",
  "privatekey": "<CV Key>"
}
```

- For example,

```
{
  "name": "Manual",
  "privatekey": "ABC123"
}
```

4. Click Send/Execute

5. The action is successful when the response status is 204 Mode has been successfully set

#### Parameter Description

Parameter	Description
name	Connection type - Manual or Express. This is specified during the initial configuration of the Enterprise Control Room. Refer <a href="#">Enterprise Control Room Settings</a> for updating this from the Enterprise Control Room UI.
key	The Master key that is used to connect to Credential Vault.

#### Check if the master key has been applied or not

This API allows you to verify whether the Enterprise Control Room Master key that connects to Credential Vault has been applied or not. Use this to check the Credential Vault status.

1. Provide the "X-Authorization" parameters in Headers.
2. Use GET method to access the Credential Vault API's using the following parameters:  
http(s)://<hostname:port>/v2/credentialvault/keys/private

- For example,

<https://crdevenv.com:81/v2/credentialvault/keys/private>

3. Click Send/Execute
4. The action is successful when the response status is 200 Private key status
5. You can view the response in the Body data:

```
{
  "applied": true
}
```

Note: The value is shown false if the private key was not applied.

## Apply Master key to unlock Credential Vault after restarting Enterprise Control Room in Manual mode

This API allows you to unlock the Credential Vault after restarting the Enterprise Control Room using the Manual mode of connection. Use this to verify whether the Credential Vault is connected.

1. Provide the "X-Authorization" parameters in Headers.
2. Use PUT method to access the Credential Vault API's using the following parameters:

`http(s)://<hostname:port>/v2/credentialvault/keys/private`

- For example,

`https://crdevenv.com:81/v2/credentialvault/keys/private`

3. Provide the request payload in the Body:

```
{
  "privateKey": "<CV Key>"
}
```

4. Click Send/Execute
5. The action is successful when the response status is 200 Private key has been successfully applied

### Parameter Description

Parameter	Description
privateKey	The Master key that is used to connect to Credential Vault. This is specified during the initial configuration of the Enterprise Control Room. You can also change the mode from <a href="#">Enterprise Control Room Settings</a> by providing this key.

### API Response Codes

Http(s) Status code	Response - Description	Corrective Action
200/204	Action completed successfully	NA

Http(s) Status code	Response - Description	Corrective Action
304	No changes applied	Update as required
400	Bad request parameter	Retry with valid parameters
401	Authentication required	Provide authentication parameters. For example, X-Authorization key
403	Unauthorized access	Ensure you are authorized to access the Enterprise Control Room
404	Not found	Ensure that the request payload is available in Enterprise Control Room
409	Conflict	Ensure the parameters provided are correct
500	Internal server error	Ensure the server is up and running
501	Permission error	Ensure that you have the required permission

## Audit Logs

All API activities are logged in the Enterprise Control Room Audit Log page. As a Enterprise Control Room administrator or a user with View everyone's audit log actions, you can view the audit entries as shown:

Actions (9 of 113)							
STATUS	TIME	ACTION TYPE	ITEM NAME	ACTION TAKEN BY	SOURCE	REQUEST ID	SOURCE DEVICE
<span style="color: red;">!</span> Unsuccessful	16:53:22 IST 2018-07-05	Connect Credential Vault	Express	N/A	Control Room	516b40f1-e059-45a8-ac3...	<a href="#">View</a>
<span style="color: red;">!</span> Unsuccessful	16:50:28 IST 2018-07-05	Connect Credential Vault	Express	N/A	Control Room	4180cf93-3c12-4f10-89e2...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	16:25:31 IST 2018-07-04	Add credential	Outlook Credentials	mike.lee	Control Room	270c9be7-b0e7-429c-a2b...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	15:39:32 IST 2018-07-04	Add credential	SharePoint Credentials	mike.lee	Control Room	8a0824de-f8b8-4e18-8b9...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	15:25:04 IST 2018-07-04	Add locker	SalesForce Locker	mike.lee	Control Room	963ce57d-a9aa-41be-aa21...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	15:17:33 IST 2018-07-04	Add locker	Outlook Locker	mike.lee	Control Room	9572a3b2-11f3-4f0b-aba5...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	15:10:49 IST 2018-07-04	Add locker	SharePoint	mike.lee	Control Room	3ff440dd-b8fb-4c46-a33c...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	17:52:34 IST 2018-07-02	Connect Credential Vault	Express	System	Control Room	3b5de874-d3bc-4272-a4b...	<a href="#">View</a>
<span style="color: green;">✓</span> Successful	16:59:26 IST 2018-07-02	Connect Credential Vault	Express	System	Control Room	3e6d8842-bf5e-4dad-aa5...	automationanywhere

The following illustration is that of a sample audit log details page for creating a locker with the Locker API:

Audit log > View action

### Add Locker

[< Back](#)

ACTION DETAILS	
Status	Successful
Action taken by	mike.lee
Object type	Action
Source device	Enterprise Control Room
Request ID	3ff440dd-b8fb-4c46-a33c-215754eda3c1
Item name	SharePoint
Time	15:10:49 IST 2018-07-04
Action type	Add Locker
Source	Control Room

ADD LOCKER DETAILS	
ATTRIBUTE	VALUE
Locker Name	SharePoint
Description	--
Locker Owners	mike.lee
Locker Managers	--
Locker Participants	--
Locker Consumers	--
No. of Credentials	0

#### Related tasks

[Create a credential](#)

## API for data migration from 10.x Enterprise Control Room to 11.x Enterprise Control Room

As a Enterprise Control Room administrator with View and Manage Migration role permissions, use the Migration APIs to migrate data from 10.x Enterprise Control Room to the current Enterprise Control Room version 11.x.

The Migration APIs allow you to,

1. Save / update connection configuration to the 10.x Enterprise Control Room database
2. Save / update connection configuration to the 2.x Bot Insight database, if available
3. Specify option to migrate data based on Roles, Users or Bots
4. Fetch list of data based on option specified for migration that is, Roles, Users, or Bots
5. View the migration progress summary
6. View migration statistics of number of entities that succeeded / failed per migration
7. Fetch list of new and updated bots from 10.x Enterprise Control Room post migration
8. Migrate files in bulk from the 10.x Enterprise Control Room My docs folder post migration

Alternately, you can use the Migration wizard given in Administration > Migration module to migrate the data from the Enterprise Control Room user interface. Refer Migration Overview for details.

Note: The examples provided in this article are for reference only.

## API End Point

Use the following end points to access the API:

1. For [migration process](#) use <Enterprise Control Room URL>/v2/migration
2. For migrating files from the My Docs folder of source 10.x Enterprise Control Room [after the migration process has completed](#) use <Enterprise Control Room URL>/v1/migration

For example,

<https://crdevenv.com:81/v2/migration>

## Migration Process APIs

The Migration APIs allow you to migrate 10.x Enterprise Control Room data to 11.x Enterprise Control Room using the end point mentioned earlier.

Before accessing the Migration API's you must first use the authentication API and pass it as a token to use a particular Migration API.

1. Use the POST method to generate a token using the end point http(s)://<hostname:port>/v1/authentication. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example,<https://crdevenv.com:81/v1/authentication>

2. Provide the following request payload in Headers

"X-Authorization" : "Authorization token"

"Content-Type" : "application/json"

3. Provide the following request payload in Body:

```
{  
  "username": "<Username>",  
  "password": "<Password>"  
}
```

- For example,

```
{  
  "username": "Ellie.Brown",  
  "password": "12345678"  
}
```

## 1. Connect to source Enterprise Control Room database

This API allows you to save and update the connection configuration to the source 10.x Enterprise Control Room database.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Provide credential parameters in Body
3. Use the POST method to connect to the 10.x Enterprise Control Room database using the end point `http(s)://<hostname:port>/v2/migration/connection`
  - For example,`https://crdevenv.com:81/v2/migration/connection`
4. Provide the following request parameters in Body:

```
{
  "host": "string", "port": 0, "databaseName": "string", "username": "string", "password": "string",
  "integratedSecurity": true, "encrypt": true, "privateKey": "string", "repoPath": "string"
}
```

- For example,

```
{
  "host": "PRODUCTLT",
  "port": 1433,
  "databaseName": "CR104MIG",
  "username": "Ellie.Brown",
  "password": "12345678",
  "integratedSecurity": true,
  "encrypt": true,
  "privateKey": "ABC123",
  "repoPath": "D:\\Data\\Automation Anywhere Server Files"
}
```

5. Click Send.

## Parameter Description

Parameter	Description
host	Source Enterprise Control Room database host name
port	Source Enterprise Control Room database port number
databaseName	Source Enterprise Control Room database name

Parameter	Description
username	Username to connect to database
password	Password to connect to database
integratedSecurity	An indicator whether to use Windows authentication when connecting to source database. Set this to true if you want use Windows authentication. The default value is false
encrypt	An indicator whether to use secure connection to source database. Set this to true if you want to use a secure connection. The default value is false
privateKey	The private key to decrypt credential values in source database. This is available for configuration during the initial Enterprise Control Room setup.
repoPath	The shared repository path where Enterprise Control Room 10.x repository is stored

## 2. Get stored connection details

This API allows you to fetch the stored connection details of source 10.x Enterprise Control Room database from where the data can be migrated.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Provide credential parameters in Body
3. Use the GET method to fetch the connection configuration of 10.x Enterprise Control Room database using the end point http(s)://<hostname:port>/v2/migration/connection
  - For example, https://crdevenv.com:81/v2/migration/connection
4. Click Send
5. You can view the result in Body data:

```
{
  "host": "productlt",
  "port": 1433,
  "databaseName": "CR104MIG",
  "username": "",
  "password": "",
  "integratedSecurity": true,
  "encrypt": false,
  "privateKey": "",
  "repoPath": "D:\\DATA\\AUTOMATION ANYWHERE SERVER FILES"
}
```

## Parameter Description

Parameter	Description
host	Source database host
port	Source database port
databaseName	Source database name
username	Username to connect to source database
password	Password to connect to source database
integratedSecurity	An indicator whether to use Windows authentication when connecting to source database, default value is false
encrypt	An indicator whether to use secure connection to source database, default value is false
privateKey	Private key to decrypt credential values in source database
repoPath	The shared repository path where Enterprise Control Room 10.x repository is stored

### 3. Connect to 2.x Bot Insight database, if available

This API allows you to connect to the source 2.x Bot Insight database if available, to migrate analytics data.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Provide credential parameters in Body.
3. Use the POST method to connect to the Bot Insight database using the end point http(s)://<hostname:port>/v2/migration/connection /botinsight
  - For example,https://crdevenv.com:81/v2/migration/connection/botinsight
4. Provide following request parameters in Body:

```
{
  "host": "string",
  "port": 0,
  "databaseName": "string",
  "username": "string",
  "password": "string",
  "integratedSecurity": true,
  "encrypt": true,
  "serverUrl": "string"
}
```

- For example,

```
{
  "host": "Productlt",
  "port": 8091,
  "databaseName": "BotInsight",
  "username": "Ellie.Brown",
  "password": "12345678",
  "integratedSecurity": true,
  "encrypt": true,
  "serverUrl": "https://productlt.aae.com:82/analytics"
}
```

5. Click Send
6. The connection parameters are successfully saved when the response status is 200 Successful operation .

## Parameter Description

Parameter	Description
host	Source Bot Insight database host name
port	Source Bot Insight database port number
databaseName	Source Bot Insight database name
username	Username to connect to database
password	Password to connect to database
integratedSecurity	An indicator whether to use Windows authentication when connecting to source database. Set this to true if you want use Windows authentication. The default value is false
encrypt	An indicator whether to use secure connection to source database. Set this to true if you want to use a secure connection. The default value is false
serverUrl	Server url where the Bot Insight Visualization ServerPort

## 4. Get stored connection details

This API allows you to fetch the stored connection details of source 2.x Bot Insight database from where the data can be migrated.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.

2. Provide credential parameters in Body
3. Use the GET method to fetch the connection configuration of 10.x Enterprise Control Room database using the end point `http(s)://<hostname:port>/v2/migration/connection/botinsight`
  - For example, `https://crdevenv.com:81/v2/migration/connection/botinsight`
4. Click Send
5. The connection parameters are successfully saved when the response status is 200 Migration config .
6. You can view the result in Body data:

```
{
  "host": "Productlt",
  "port": 8091,
  "databaseName": "BotInsight",
  "username": "Ellie.Brown",
  "password": "12345678",
  "integratedSecurity": true,
  "encrypt": true,
  "serverUrl": "https://productlt.aae.com:82/analytics"
}
```

## Parameter description

Parameter	Description
host	Source Bot Insight database host name
port	Source Bot Insight database port number
databaseName	Source Bot Insight database name
username	Username to connect to database
password	Password to connect to database
integratedSecurity	An indicator whether to use Windows authentication when connecting to source database. Set this to true if you want to use Windows authentication. The default value is false
encrypt	An indicator whether to use secure connection to source database. Set this to true if you want to use a secure connection. The default value is false
serverUrl	Server url where the Bot Insight Visualization ServerPort

## 5. List of entities of TYPE available for migration in source database

This API returns list of entities available for migration in source database by TYPE parameter. Using the either of the options - Role, User, Bot, or Schedule, you can migrate all data that is associated with the parameter chosen.

Note: For selective migration of data, that is, selecting only certain data based on specified parameter, use the [Migration wizard](#) provided in the Enterprise Control Room.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to connect to the Enterprise Control Room database using the end point `http(s)://<hostname:port>/v2/migration/connection /entities` followed by TYPE parameter that could include any one of the option - Roles, Users, Bots, or Schedules
  - For example,`https://crdevenv.com:81/v2/migration/connection/entities?Type=ROLE`
3. Click Send
4. The data is returned when the response status is 200
5. The list of entities based on TYPE parameter are displayed in Body.

```
{
  "entities": [
    {
      "id": "0", "type": "ROLE", "sourceld": "1", "targetId": "0", "name": "Admin", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "2", "targetId": "0", "name": "Basic", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "3", "targetId": "0", "name": "IQBotValidator", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "4", "targetId": "0", "name": "AnalyticsExperts", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "5", "targetId": "0", "name": "AnalyticsConsumers", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "6", "targetId": "0", "name": "BotAgentUser", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "7", "targetId": "0", "name": "BotFarmAdmin", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "8", "targetId": "0", "name": "IQBotServices", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "9", "targetId": "0", "name": "Bot Creator 10x", "status": "SUCCESS", "reason": ""
    },
    {
      "id": "0", "type": "ROLE", "sourceld": "10", "targetId": "0", "name": "Bot Runner 10x", "status": "SUCCESS", "reason": ""
    }
  ]
}
```

```
{
  "id": "0", "type": "ROLE", "sourceld": "11", "targetId": "0", "name": "Bot Scheduler 10x", "status": "SUCCESS",
  "reason": ""
}

]
}
```

## Parameter description

Parameter	Description
id	Migration ID
type	Type of entity selected for migration - Role, User or Bot
sourceld	Id of entity in the source database
targetId	Id of entity after Migration in the target database
name	Name of the entity in the source database
status	The migration status for that particular entity
reason	The reason for migration failure for that particular entity

## 6. Prepare migration data based on User input

This API allows you to migrate entities with associated data based on the sub-section of the entity type specified for migration.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to migrate the data using the endpoint `http(s)://<hostname:port>/v2/migration/prepare`
  - For example,<https://crdevenv.com:81/v2/migration/prepare>
3. Provide following request payload in Body:

```
{
  "selected": [
    {
      "type": "<entity type>",
      "sourceld": "string"
    },
    {
      "excludes": [ "<entity type>"
    ]
  }
}
```

- For example,

```
{ "selected": [ { "type": "ROLE", "sourceld": "12" } ], "excludes": [ "BOT" ] }
```

4. Click Send
5. The data is listed successfully for migration when the response status is 200
6. The result is displayed in the Body

```
{ "selected":  
[  
 { "type": "ROLE", "sourceld": "12" } ],  
"excludes": [ "BOT" ]  
}
```

## Parameter description

Parameter	Description
type	Type of entity selected for migration - Role, User or Bot and Schedules
sourceld	The id of the entity in the source database
excludes	<p>The entity name that is excluded from migration. The options are available based on the entity type selected.</p> <p>Hence, when you select Role or User you can Exclude Bots and Schedules; when you select Bots and Schedules, you can Exclude MetaBots), and/or Overwrite existing Bots .</p>

## 7. Start Migration

This API allows you to launch the migration process.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the POST method to migrate the data using the endpoint http(s)://<hostname:port>/v2/migration/start/async
  - For example, <https://crdevenv.com:81/v2/migration/start/async>
3. Click Send
4. The data migration starts successfully when the response status is 200 Successful operation
5. The result is displayed in the Body data

```
{  
 "id": 1,  
 "name": "2018.07.17.16.13.48.ellie.brown",
```

```

  "createdBy": 1,
  "migrationType": "ROLE_EXCLUDE_BOT_SCHEDULE"
}

```

## Parameter description

Parameter	Description
id	Migration ID
name	Name of the user who initiated the migration
createdBy	Id of the entity that started the migration i.e. the Enterprise Control Room administrator
migrationType	The migration type chosen - Role, User, or Bots and Schedules

## 8. Migration object by id

This API lists the migration object details based on the ID that is generated using the Start Migration API.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint http(s)://<hostname:port>/v2/migration/<id>
  - For example, <https://crdevenv.com:81/v2/migration/9>
3. Click Send.
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

```

{
  "id": "9",
  "name": "2018.07.17.16.13.48.ellie.brown",
  "startTime": "2018-07-17T10:43:48.127Z",
  "endTime": "2018-07-17T10:43:49.833Z",
  "createdBy": "1",
  "migrationType": "ROLE_EXCLUDE_BOT_SCHEDULE",
  "entities": []
}

```

## Parameter description

Parameter	Description
id	Migration ID
name	Name of the user who initiated the migration
startTime	The time when the migration was initiated
endTime	The time when the migration was complete
createdBy	Id of the entity that started the migration i.e. the Enterprise Control Room administrator
entities	List of entities migrated during migration process
migrationType	The migration type chosen - Role, User, or Bots and Schedules

## 9. Migration Progress

This API allows you to view the process of migration that is in progress.

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Provide credential parameters in Body
3. Use the GET method to fetch object details by id using the endpoint `http(s)://<hostname:port>/v2/migration/pogress`
  - For example, <https://crdevenv.com:81/v2/migration/progress>
4. Click Send.
5. The object details are listed successfully when the response status is 200
6. The details are shown in the Body data:

```
{
  "migration": {
    "id": "10",
    "name": "2018.07.17.16.55.59.ellie.brown",
    "startTime": "2018-07-17T11:25:59.800Z",
    "endTime": "2018-07-17T11:26:16.002Z",
    "createdBy": "1",
    "migrationType": "BOT_EXCLUDE_MetaBot",
    "entities": []
  },
  "current": "SCHEDULE",
  "progress": {
    "BOT": {
      "total": "10",
      "successful": "7",
      "failed": "0",
      "skipped": "3"
    },
    "SCHEDULE": {
      "total": "8",
      "successful": "8",
      "failed": "0",
      "skipped": "0"
    }
  }
}
```

## Parameter description

Parameter	Description
id	Migration id
name	Migration name displayed
startTime	Timestamp when Migration process started
endTime	Timestamp when Migration process completed. Null when migration is in progress
createdBy	Id of the user who created/started the migration process
current	Type of entity currently being migrated - ROLE, USER, CREDENTIAL, BOT, or SCHEDULE ]
progress	Progress of the entities - <ul style="list-style-type: none"> <li>• total - total number of entities of specific type to be migrated</li> <li>• successful - number of entities out of total migrated successfully</li> <li>• failed - number of entities out of total failed to be migrated</li> <li>• skipped - number of entities out of total skipped during migration</li> </ul>

## 10. Migration statistics - number of entities that succeeded / failed per migration

This API allows you to view the number of successful or failed entities per migration.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint `http(s)://<hostname:port>/v2/migration/statistics`
  - For example, <https://crdevenv.com:81/v2/migration/statistics>
3. Click Send.
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

```
{
  "items": [
    {
      "id": "1",
      "name": "2018.07.13.11.14.59.ellie.brown",
      "startTime": "2018-07-13T05:44:59.787Z",
      "endTime": "2018-07-13T06:56:25.537Z",
      "createdBy": "1",
      "duration": "4285s",
      "numSuccess": 0,
      "numFailed": 0,
      "numSkipped": 0
    },
    {
      "id": "2",
      "name": "2018.07.13.12.28.08.ellie.brown",
      "startTime": "2018-07-13T06:58:09.283Z",
      "endTime": "2018-07-13T06:58:12.910Z",
      "createdBy": "1",
      "duration": "3s",
      "numSuccess": 1,
      "numFailed": 1,
      "numSkipped": 0
    }
  ]
}
```

```
{
  "id": "3", "name": "2018.07.13.12.40.34.ellie.brown", "startTime": "2018-07-13T07:10:34.470Z", "endTime": "2018-07-13T07:10:40.060Z", "createdBy": "1", "duration": "5s", "numSuccess": 10, "numFailed": 0, "numSkipped": 0 },
{
  "id": "4", "name": "2018.07.13.12.42.19.ellie.brown", "startTime": "2018-07-13T07:12:20.007Z", "endTime": "2018-07-13T07:12:23.107Z", "createdBy": "1", "duration": "3s", "numSuccess": 0, "numFailed": 0, "numSkipped": 6 },
{
  "id": "5", "name": "2018.07.13.13.39.53.ellie.brown", "startTime": "2018-07-13T08:09:53.113Z", "endTime": "2018-07-13T08:10:02.673Z", "createdBy": "1", "duration": "9s", "numSuccess": 4, "numFailed": 0, "numSkipped": 0 }
]
}
```

## Parameter description

Parameter	Description
id	migration id
name	Migration name displayed
startTime	Timestamp when Migration process started
endTime	Timestamp when Migration process completed. Null when migration is in progress
createdBy	Id of the user who created the object
duration	Duration of migration - seconds or nano seconds
numSuccess	Number of items successfully migrated
numFailed	Number of items that failed to migrate
numSkipped	Number of items that were skipped during migration

## Post Migration process APIs

Use the Migration APIs after the process has completed to

1. Import files from the My Docs folder of 10.x Enterprise Control Room
2. Fetch the list of new or modified bots from 10.x Enterprise Control Room since last migration run  
Note: Before accessing the APIs you must first use the authentication API and pass it as a token to use a particular Migration API.
3. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example,<https://crdevenv.com:81/v1/authentication>

4. Provide the following request payload in Headers

"X-Authorization" : "Authorization token"

"Content-Type" : "application/json"

5. Provide the following request payload in Body:

```
{
  "username": "<Username>",
  "password": "<Password>"
}
```

- For example,

```
{
  "username": "Ellie.Brown",
  "password": "12345678"
}
```

**Important:** When the error code 404 is shown while using any or all the post migration APIs, re-use the API to fetch the list of root folders from 10.x Enterprise Control Room i.e. `http(s)://<hostname:port>/v1/migration/legacyrepository/rootDirectories`.

## A. Import files from My Docs folder

Use certain set of APIs to migrate files from the My Docs folder of the 10.x Enterprise Control Room. These APIs allow you to import large number of files that could either be used in bots as dependencies or though stand alone are useful for automation.

### 1. Fetch list of root folders from 10.x Enterprise Control Room

This API allows you to fetch the list of folders available in the 10.x Enterprise Control Room Repository. This will help you understand the folder structure that was available in the source Enterprise Control Room.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint `http(s)://<hostname:port>/v1/migration/legacyrepository/rootDirectories` followed by `excludeMetaBot` parameter
  - For example, `https://crdevenv.com:81/v1/migration/legacyrepository/rootDirectories?excludeMetaBot=true`
3. Click Send
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

[

```
{ "name": "My Docs", "path": "Automation Anywhere\\My Docs" },
```

```
{
  "name": "My Exes", "path": "Automation Anywhere\\My Exes"},

  { "name": "My Reports", "path": "Automation Anywhere\\My Reports"},

  { "name": "My Scripts", "path": "Automation Anywhere\\My Scripts"},

  { "name": "My Tasks", "path": "Automation Anywhere\\My Tasks"},

  { "name": "My Workflow", "path": "Automation Anywhere\\My Workflow" }

]
```

## Parameter description

Parameter	Description
name	Name of the directory/folder
path	Directory/folder path

## 2. Fetch list of sub-folders of a root-folder from 10.x Control Room

This API allows you to fetch the list of sub-folders for a given root-folder available in the 10.x Enterprise Control Room Repository. This will help you understand the folder structure of the source Enterprise Control Room.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint `http(s)://<hostname:port>/v1/migration/legacyrepository/childDirectories` followed by the path parameter
  - For example, `https://crdevenv.com:81/v1/migration/legacyrepository/childDirectories?path=Automation Anywhere\My Docs`
3. Click Send.
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

```
{
  "folders": [
    {
      "name": "Log-Files", "path": "Automation Anywhere\\My Docs\\Log-Files"
    }
  ]
}
```

## Parameter Description

Parameter	Description
folders	List of sub directories
name	Name of the directory/folder
path	Directory/folder path

### 3. Fetch list of files in given folder

This API allows you to fetch the list of files available in a given folder in the source Enterprise Control Room repository.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint `http(s)://<hostname:port>/v1/migration/legacyrepository/childFiles` followed by the path) and excludeMetaBot parameters
  - For example, `https://crdevenv.com:81/v1/migration/legacyrepository/childFiles?path=Automation Anywhere\My Docs\Log-Files&excludeMetaBot=false`
3. Click Send
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

```
{
  "files": [
    {
      "id": "280", "name": "ActiveMQServer-2018-Jul-17-2.log.zip", "path": "Automation Anywhere\\My Docs\\Log-Files\\ActiveMQServer-2018-Jul-17-2.log.zip"
    },
    {
      "id": "281", "name": "IgniteServer-2018-Jul-17-4.log.zip", "path": "Automation Anywhere\\My Docs\\Log-Files\\IgniteServer-2018-Jul-17-4.log.zip"
    },
    {
      "id": "283", "name": "WebCR_Ignite-2018-Jul-17-4.log.zip", "path": "Automation Anywhere\\My Docs\\Log-Files\\WebCR_Ignite-2018-Jul-17-4.log.zip"
    },
    {
      "id": "284", "name": "WebCR_License-2018-Jul-17-4.log.zip", "path": "Automation Anywhere\\My Docs\\Log-Files\\WebCR_License-2018-Jul-17-4.log.zip"
    },
    {
      "id": "292", "name": "WebCR_Migration-2018-Jul-17-4.log", "path": "Automation Anywhere\\My Docs\\Log-Files\\WebCR_Migration-2018-Jul-17-4.log"
    },
    {
      "id": "285", "name": "WebCR_Migration-2018-Jul-17-4.log.zip", "path": "Automation Anywhere\\My Docs\\Log-Files\\WebCR_Migration-2018-Jul-17-4.log.zip"
    },
    {
      "id": "293", "name": "WebCR_Migration-2018-Jul-17-4.txt", "path": "Automation Anywhere\\My Docs\\Log-Files\\WebCR_Migration-2018-Jul-17-4.txt"
    }
  ]
}
```

]

}

## Parameter Description

Parameter	Description
files	List of sub files
id	File id of the bot
name	Name of the directory/folder
path	Directory/folder path

## 4. Search for a folder by name in Enterprise Control Room 10.x

This API allows you to search for a folder by given name from the source Enterprise Control Room My Docs repository.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the GET method to fetch object details by id using the endpoint http(s)://<hostname:port>/v1/migration/legacyrepository/folders followed by the taskName parameter
  - For example, <https://crdevenv.com:81/v1/migration/legacyrepository/folders?taskName=Import-Table>
3. Click Send
4. The object details are listed successfully when the response status is 200
5. The details are shown in the Body data:

```
{
  "paths": [
    "Automation Anywhere\\My Docs\\Import-Table"
  ]
}
```

## Parameter description

Parameter	Description
paths	List of Directory/folder path

## 5. Fetch list of files for a given folder in Enterprise Control Room 10.x

This API allows you to fetch a list of files from a given folder from the source Enterprise Control Room My Docs repository.

1. Provide the "X-Authorization" parameters in Headers.

2. Use the POST method to fetch list of files for a given folder using the endpoint http(s)://<hostname:port>/v1/legacyrepository/files

- For example, <https://crdevenv.com:81/v1/legacyrepository/files>

3. Provide the list of folder paths as request payload in Body

```
[  
  "string"  
]
```

- For example, the following lists the files available

```
[  
  "Automation Anywhere\\My Docs\\Import-Table"  
]
```

4. Click Send

5. The object details are listed successfully when the response status is 200

6. The Response details are shown in the Body data:

```
{  
  "files":  
    [  
      { "id": 1281, "type": "BOT", "sourceld": "1281", "targetId": 0, "name": "Automation Anywhere\\My Docs\\Import-Table\\Import-Table.txt", "status": "SUCCESS", "reason": "" },  
      { "id": 293, "type": "BOT", "sourceld": "293", "targetId": 0, "name": "Automation Anywhere\\My Docs\\Import-Table\\WebCR_Migration-2018-Jul-17-4.txt", "status": "SUCCESS", "reason": "" }  
    ]  
}
```

## Parameter Description

Parameter	Description
files	List of sub files
type	file type
sourceld	Id of entity in the source database
targetId	Id of entity after migration in the target database
name	Name of the directory/folder
status	Status of response - SUCCESS, SKIPPED, or FAILED

Parameter	Description
reason	Description for the reason of status FAILED or SKIPPED

## B. Migrate new or modified bots from 10.x since the last migration in 11.x

This API allows you to fetch list of bots that are new or modified in source Enterprise Control Room version 10.x after data has already been migrated to destination Enterprise Control Room version 11.x . Essentially, this API allows you the liberty to continue using your 10.x environment whilst the 11.x environment is ready to go into production.

1. Provide the "X-Authorization" parameters in Headers.
2. Use the POST method to fetch object details by id using the endpoint http(s)://<hostname:port>/v1/legacyrepository/changedfiles
  - For example, <https://crdevenv.com:81/v1/legacyrepository/changedfiles>
3. Provide the list of folder paths as request payload in Body

```
{
  "changeSince": "<last migration date and time>"
}

• For example, the following lists the bot names that were update post migration

{
  "changeSince": "2018-06-25T12:05:00+05:30"
}
```

- Tip: Do not specify the changeSince parameter to consider the delta for last migration date and time.
4. Click Send.
  5. The object details are listed successfully when the response status is 200
  6. The Response details are shown in the Body data:

```
{
  "changedfiles": [
    {
      "type": "BOT", "sourceld": "6", "name": "Automation Anywhere\\My Tasks\\Sample Tasks\\Import-Table.atmx"
    },
    {
      "type": "BOT", "sourceld": "7", "name": "Automation Anywhere\\My Tasks\\Sample Tasks\\List-Variable.atmx"
    }
  ]
}
```

## Parameter description

Parameter	Description
changedFiles	List of entities that were changed or are new since last migration run
type	entity type
sourceld	Id of entity in the source database
name	Name of the directory/folder

## API Response Codes

Http(s) Status code	Response - Description	Corrective Action
200	Successful operation	NA
400	Bad request	Retry with valid parameters
401	Authentication required	Retry by providing authentication parameters
403	Unauthorized access	Ensure you have appropriate permissions to perform this operation
404	Not found	Ensure the requested data is present in Enterprise Control Room
409	Conflict	Ensure the parameters provided are correct
500	Internal server error	Ensure the server is up and running
501	Permission error	Ensure that you have the required permission

## Audit Logs

The Audit Log displays individual entry for each entity that is migrated.

TIME	ACTION TYPE	ITEM NAME	ACTION TAKEN BY	SOURCE DEVICE	SOURCE	REQUEST ID
16:42:39 IST 2018-07-31	Create automation	SCH-Weekly-2-TTS	ellie.brown	automationanywhere	Control Room	07cd7a05
16:42:39 IST 2018-07-31	Create automation	SCH-Daily-Weekdays	ellie.brown	automationanywhere	Control Room	b809e5b3
16:42:39 IST 2018-07-31	Create automation	SCH-Daily-3	ellie brown	automationanywhere	Control Room	84272995
16:42:39 IST 2018-07-31	Create automation	SCH-Once	ellie.brown	automationanywhere	Control Room	2cde4431
16:42:38 IST 2018-07-31	Migration started	2018.07.31.16.42.38 ellie...	ellie brown	automationanywhere	Control Room	b3c6675c
16:41:26 IST 2018-07-31	Migration finished	2018.07.31.16.41.15 ellie...	ellie brown	automationanywhere	Control Room	2aa9bf29
16:41:26 IST 2018-07-31	Create automation	SCH-Weekly-MWF-1	ellie.brown	automationanywhere	Control Room	54156c00
16:41:26 IST 2018-07-31	Create automation	SCH-Weekly-2-TTS	ellie.brown	automationanywhere	Control Room	57345637
16:41:26 IST 2018-07-31	Create automation	SCH-Daily-Weekdays	ellie.brown	automationanywhere	Control Room	985f7c70
16:41:26 IST 2018-07-31	Create automation	SCH-Daily-3	ellie.brown	automationanywhere	Control Room	55341fc3
16:41:26 IST 2018-07-31	Create automation	SCH-Once	ellie brown	automationanywhere	Control Room	2691a6db
16:41:26 IST 2018-07-31	Upload bot	Analytics_MortgagePro...	ellie.brown	automationanywhere	Control Room	8be4b774
16:41:25 IST 2018-07-31	Upload bot	Analytics_ATM Reconcil...	ellie.brown	automationanywhere	Control Room	f41d03da
16:41:24 IST 2018-07-31	Create automation	SCH-Weekly-Sun	ellie.brown	automationanywhere	Control Room	32b43f77

When the migration process is initiated, a Migration started entry is logged in Audit log. Similarly when the migration process is completed, a Migration finished entry is logged. Between these two entries, migration entries are logged for each entity that is migrated such as Create, Update, or Upload operation.

Click to view details of the process.

Related concepts

[Migration overview](#)

Related reference

[Migration: FAQs](#)

[Migration - known behavior](#)

## API for deploying and monitoring bot progress

As a Enterprise Control Room administrator or a user with View and Manage Scheduled Activity permission, deploy bots and monitor its progress using a set of Enterprise Control Room APIs.

The Deploy and Monitor Bot APIs allow you to do the following:

1. Retrieve details of a given bot from the server repository to identify its file id to be used for bot deployment.
2. Fetch list of devices (Bot Runners) available for automation and its automation status.
3. Deploy a bot on given device(s) and fetch its automation id.
4. Monitor the bot progress based on automation id.

Note: The examples provided in this article are for reference only.

Before accessing the Deploy and Monitor API's the authentication API and pass it as a token to use a particular API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.
2. Provide the following request payload in Headers

`"X-Authorization" : "Authorization token"`

`"Content-Type" : "application/json"`

3. Provide the following request payload in Body:

```
{  
  "username": "<Username>",  
  "password": "<Password>"  
}
```

For example,

```
{  
  "username": "Ellie.Brown",  
  "password": "12345678"  
}
```

## API to fetch bot details

Use this API to fetch details of a bot from the server repository. The bot id fetched from this API is used in the API for bot Deployment.

### API end point

Use the following end point to access the APIs:

`<Enterprise Control Room URL>/v2/repository/file/list`

## Fetch bots details

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "filter": {
    "operator": "<eq, ne, lt, le, gt, or ge>",
    "value": "<bot name>",
    "field": "fileName"
  }
}
```

Tip: Use 'eq' or 'substring' operator with field as 'name' and bot name in the 'value' of the filter, to fetch bot details of all the bots matching the bot name provided. Additional filtering, ordering and pagination rules can also be requested.

For example, the following fetches details of the bot Import-Table.atmx:

```
{
  "filter": {
    "operator": "eq",
    "value": "Import-Table.atmx",
    "field": "fileName"
  }
}
```

3. Click Send.
4. The action is successful when the response status is 200.
5. You can view the response in the Body data.

```
{
  "page": {
    "offset": 0,
    "total": 1,
    "totalFilter": 1
  },
  "list": [
    {
      "id": "10",
      "parentid": "9",
      "name": "Import-Table.atmx"
    }
  ]
}
```

```

    "name": "Import-Table.atmx",
    "canDelete": true,
    "canDownload": true,
    "canExecute": true,
    "canUpload": true,
    "canRun": true,
    "lastModified": "2018-07-18T04:42:05Z",
    "lastModifiedBy": "0",
    "path": "Automation Anywhere\\My Tasks\\Sample Tasks\\Import-Table.a
tmx",
    "directory": false,
    "size": 418719,
    "isLocked": false,
    "productionVersion": "",
    "lockedBy": "",
    "latestVersion": "",
    "fileLastModified": "2018-07-18T04:42:05Z"
}
]
}

```

## Parameter Description

Parameter	Description
operator	<ul style="list-style-type: none"> <li>• NONE</li> <li>• lt - less than</li> <li>• le - less than equal to</li> <li>• eq - equal to</li> <li>• ne - not equal to</li> <li>• ge - greater than equal to</li> <li>• gt - greater than</li> <li>• substring</li> <li>• and</li> <li>• or</li> <li>• not</li> </ul>
value	Name of the bot

Parameter	Description
fileId	File id of the bot for which details are sought
id	Id of the bot
parentId	Parent directory Id of the bot
name	Name of the bot
canDelete	Logged in user has rights to delete the bot - true or false
canDownload	Logged in user has rights to download the bot - true or false
canExecute	Logged in user has rights to execute the bot# - true or false
canUpload	Logged in user has rights to upload the bot - true or false
canRun	Logged in user has rights to run\schedule the bot - true or false
lastModified	Date and time when the bot was last updated
path	Relative path of the bot
directory	Flag for directory - true or false
size	Size of the bot in KB
isLocked	Is the bot checked out by another user* - true or false
productionVersion	Current production version of the bot*
lockedBy	user id who has locked the bot *
latestVersion	Latest version of the bot*
fileLastModified	Date and time when the bot was last updated

# applicable only for MetaBots

\* applicable when version control is enabled

## API to fetch list of available devices (Bot Runner clients)

Use this API to fetch the list of devices available for automation deployment and its current status of automation. To achieve this, you need to follow the workflow mentioned here:

1. Fetch the list of devices, its type and connection status
2. Verify status of bot execution of devices

### 1. Fetch list of devices

Use this API to fetch the list of devices, Bot Runners. available for bot deployment. The device id retrieved from this can be passed as a parameter in the Deployment API.

## API end point

Use the following end point to access the APIs:

<Enterprise Control Room URL>/v2/devices/list

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "filter": {
    "operator": "<eq, ne, lt, le, gt, or ge>",
    "value": "<api.automationanywhere.com>",
    "field": "<hostname>"
  },
  "page": {}
}
```

Tip: Use 'hostname' for filtering on devices. Additional filtering, ordering and pagination rules can also be requested.

For example, the following fetches the hostname of a device:

```
{
  "filter": {
    "operator": "eq",
    "value": "AASPL.COM",
    "field": "hostname"
  },
  "page": {}
}
```

3. Click Send
4. The action is successful when the response status is 200
5. You can view the response in the Body data.

```
{
  "page": {
    "offset": 0,
    "total": 2,
    "totalFilter": 2
  },
```

```

"list": [
  {
    "id": "1",
    "type": "BOT_RUNNER",
    "hostname": "CRDEVENV",
    "userid": "3",
    "username": "amy.cheng",
    "status": "CONNECTED",
    "poolname": ""
  },
  {
    "id": "2",
    "type": "BOT_RUNNER",
    "hostname": "CRDEVENV",
    "userid": "5",
    "username": "jane.smith",
    "status": "CONNECTED",
    "poolname": ""
  }
]
}

```

## Parameter Description

Parameter	Description
operator	<ul style="list-style-type: none"> <li>• NONE</li> <li>• lt - less than</li> <li>• le - less than equal to</li> <li>• eq - equal to</li> <li>• ne - not equal to</li> <li>• ge - greater than equal to</li> <li>• gt - greater than</li> <li>• substring</li> <li>• and</li> <li>• or</li> <li>• not</li> </ul>
value	Value of the field to be filtered
field	id, hostName, userId

Parameter	Description
id	Id of the device
type	Device type - BOT_RUNNER or BOT_CREATOR
hostname	Host name of the machine where the device is logged in
userid	User id of the device
username	User name of the device
status	Status of the device - OFFLINE, CONNECTED, or DISCONNECTED
poolname	Name of the device pool

## 2. API to fetch automation status

Use this API to fetch the current status of automation - whether a bot is running or not.

### API end point

Use the following end point to access the APIs:

<Enterprise Control Room URL>/v2/activity/list

For example, <Your Enterprise Control Room URL>/v2/activity/list

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "filter": {
    "operator": "<and/or>",
    "operands": [
      {
        "operator": "<eq, ne, lt, le, gt, or ge>",
        "value": "<id>",
        "field": "deviceId"
      },
      {
        "operator": "<and/or>",
        "operands": [
          {
            "operator": "<eq, ne, lt, le, gt, or ge>",
            "value": "<Automation status>",
            "field": "status"
          }
        ]
      }
    ]
  }
}
```

```
        },
        {
            "operator": "<eq, ne, lt, le, gt, or ge>",
            "value": "<Automation status>",
            "field": "status"
        }
    ]
}
]
}
}
```

For example, the following fetches the status of bot execution for the device with id 2:

```
{
  "filter": {
    "operator": "and",
    "operands": [
      {
        "operator": "eq",
        "value": "2",
        "field": "deviceId"
      },
      {
        "operator": "or",
        "operands": [
          {
            "operator": "eq",
            "value": "RUNNING",
            "field": "status"
          }
        ]
      }
    ]
  }
}
```

3. Click Send.
4. The action is successful when the response status is 200.
5. You can view the response in the Body data.

```
{  
  "page": {  
    "offset": 0,  
    "total": 3,  
    "totalFilter": 1  
  },  
  "list": [  
    {  
      "id": "6e312e83-4115-4861-b118-26660b2b7b08",  
      "automationName": "Import-Table_18.07.24.16.13.52_ellie.brown_API",  
      "fileName": "Import-Table.atmx",  
      "filePath": "\\\My Tasks\\Sample Tasks\\Import-Table.atmx",  
      "type": "TASK",  
      "startDateTime": "2018-07-24T10:43:59Z",  
      "endDateTime": "2018-07-24T10:44:25Z",  
      "command": "Web Recorder",  
      "status": "RUN_PAUSED",  
      "progress": 43,  
      "automationId": "6",  
      "userId": "5",  
      "deviceId": "2",  
      "currentLine": 7,  
      "totalLines": 16,  
      "fileId": "10",  
      "modifiedBy": "5",  
      "createdBy": "1",  
      "modifiedOn": "2018-07-24T10:44:26.209Z",  
      "createdOn": "2018-07-24T10:43:52.808Z",  
      "deploymentId": "e11d7888-1187-4ce7-b9c4-5790715bf93b",  
      "queueName": "",  
      "queueId": "",  
      "usingRdp": false,  
      "message": "Task is stopped by user.\r\nAn error occurred at line n"}]
```

```

umber 7 of Task 'Import-Table'. Open the Task in Workbench to view action
at line number 7.",
    "canManage": true
}
]
}

```

## Parameter Description

Parameter	Description
operator	<ul style="list-style-type: none"> <li>• NONE</li> <li>• lt - less than</li> <li>• le - less than equal to</li> <li>• eq - equal to</li> <li>• ne - not equal to</li> <li>• ge - greater than equal to</li> <li>• gt - greater than</li> <li>• substring</li> <li>• and</li> <li>• or</li> <li>• not</li> </ul>
value	Automation status - DEPLOYED, RUNNING, RUN_PAUSED, UNKNOWN, COMPLETED, RUN_FAILED, RUN_ABORTED, RUN_TIMED_OUT, or DEPLOY_FAILED
field	Status of the bot for which details are sought
id	Unique execution id
automationName	Name of the automation to which the execution is associated
fileName	Name of the bot that is deployed to execute
filePath	Relative path of the bot that is deployed to execute
type	Type of activity - TASK
startDateTime	Date and time when the execution started
endDateTime	Date and time when the execution ended
command	Current command of the execution
status	Current status of the execution - DEPLOYED, RUNNING, RUN_PAUSED, UNKNOWN, COMPLETED, RUN_FAILED, RUN_ABORTED, RUN_TIMED_OUT, or DEPLOY_FAILED
progress	Current progress of the execution in percentage
automationId	Id of the automation to which the execution is associated

Parameter	Description
userId	Corresponding User id of the device where the bot is deployed
deviceid	Device id where the bot is deployed
currentLine	Current line of bot that is deployed to execute
totalLines	Total lines of the bot that is deployed to execute
fileId	Id of the bot that is deployed to execute
modifiedBy	Id of the user who last updated the execution
createdBy	Id of the user who created the automation associated with the execution
modifiedOn	Date and time when the execution was last updated
createdOn	Date and time when the execution was created
deploymentId	Deployment id to which the execution is associated
queueName	Queue name
queueId	Queue id
usingRdp	Deploy bot using remote desktop process - true or false
message	Message if available
canManage	Does the current logged in user has rights to manage the execution - true or false

## API to deploy bot

Use this to deploy a bot using device id on one or more devices using the file id of a bot.

### API end point

Use the following end point to access the APIs:

<Enterprise Control Room URL>/v2/automations/deploy

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "fileId": "<file id of bot>",
  "deviceIds": [
    "<device id 1>",
    "<device id 2>",
    "<device id 3>"
  ],
}
```

```

    "runWithRdp": "<true or false>"
}
```

For example, the following deploys a bot with id 10 on devices with id 1, 2, and 3 and deploys a bot using RDP:

```
{
  "fileId": "10",
  "deviceIds": [
    "1",
    "2",
    "3"
  ],
  "runWithRDP": true
}
```

3. Click Send
4. The action is successful when the response status is 200
5. You can view the response in the Body data.

```
{
  "automationId": "6"
}
```

## Parameter Description

Parameter	Description
fileId	ID of the bot for which is to be deployed
deviceId	Device id where the bot is to be deployed
runWithRDP	Deploy bot using remote desktop process - true or false
automationId	Id of the automation to which the execution is associated

## API to monitor bot execution

Use this API to monitor the bot progress based on automationId that is returned using the Bot Deployment API.

Note: This API is also used to fetch a list of currently running bots on devices.

## API end point

Use the following end point to access the APIs:

```
<Your Enterprise Control Room URL>/v2/activity/list
```

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the POST method to provide the following request payload in Body:

```
{
  "filter": {
    "operator": "<eq, ne, lt, le, gt, or ge>",
    "value": "<automationId>",
    "field": "automationId"
  }
}
```

For example, the following fetches the status of automation with Id 15:

```
{
  "filter": {
    "operator": "eq",
    "value": "6",
    "field": "automationId"
  }
}
```

3. Click Send
4. The action is successful when the response status is 200
5. You can view the response in the Body data.

```
{
  "page": {
    "offset": 0,
    "total": 3,
    "totalFilter": 1
  },
  "list": [
    {
      "id": "6e312e83-4115-4861-b118-26660b2b7b08",
      "automationName": "Import-Table_18.07.24.16.13.52_ellie.brown_API",
      "status": "Success"
    }
  ]
}
```

```

"fileName": "Import-Table.atmx",
"filePath": "\\\My Tasks\\Sample Tasks\\Import-Table.atmx",
"type": "TASK",
"startDateTime": "2018-07-24T10:43:59Z",
"endDateTime": "2018-07-24T10:44:25Z",
"command": "Web Recorder",
"status": "RUN_PAUSED",
"progress": 43,
"automationId": "6",
"userId": "5",
"deviceId": "2",
"currentLine": 7,
"totalLines": 16,
"fileId": "10",
"modifiedBy": "5",
"createdBy": "1",
"modifiedOn": "2018-07-24T10:44:26.209Z",
"createdOn": "2018-07-24T10:43:52.808Z",
"deploymentId": "e11d7888-1187-4ce7-b9c4-5790715bf93b",
"queueName": "",
"queueId": "",
"usingRdp": false,
"message": "Task is stopped by user.\r\nAn error occurred at line number 7 of Task 'Import-Table'. Open the Task in Workbench to view action at line number 7.",
"canManage": true
}
]
}

```

## Parameter Description

Parameter	Description
operator	<ul style="list-style-type: none"> <li>• NONE</li> <li>• lt - less than</li> <li>• le - less than equal to</li> <li>• eq - equal to</li> </ul>

Parameter	Description
	<ul style="list-style-type: none"> <li>• ne - not equal to</li> <li>• ge - greater than equal to</li> <li>• gt - greater than</li> <li>• substring</li> <li>• and</li> <li>• or</li> <li>• not</li> </ul>
value	Automation status - DEPLOYED, RUNNING, RUN_PAUSED, UNKNOWN, COMPLETED, RUN_FAILED, RUN_ABORTED, RUN_TIMED_OUT, or DEPLOY_FAILED
field	Id of the bot for which details are sought
id	Unique execution id
automationName	Name of the automation to which the execution is associated
fileName	Name of the bot that is deployed to execute
filePath	Relative path of the bot that is deployed to execute
type	Type of activity - TASK
startDateTime	Date and time when the execution started
endDateTime	Date and time when the execution ended
command	Current command of the execution
status	Current status of the execution - DEPLOYED, RUNNING, RUN_PAUSED, UNKNOWN, COMPLETED, RUN_FAILED, RUN_ABORTED, RUN_TIMED_OUT, or DEPLOY_FAILED
progress	Current progress of the execution in percentage
automationId	Id of the automation to which the execution is associated
userId	Corresponding User id of the device where the bot is deployed
deviceid	Device id where the bot is deployed
currentLine	Current line of bot that is deployed to execute
totalLines	Total lines of the bot that is deployed to execute
fileId	Id of the bot that is deployed to execute
modifiedBy	Id of the user who last updated the execution
createdBy	Id of the user who created the automation associated with the execution
modifiedOn	Date and time when the execution was last updated
createdOn	Date and time when the execution was created
deploymentId	Deployment id to which the execution is associated
queueName	Queue name

Parameter	Description
queueld	Queue id
usingRdp	Deploy bot using remote desktop process - true or false
message	Message if available
canManage	Does the current logged in user has rights to manage the execution - true or false

## API Response Codes

Http(s) Status code	Response - Description	Corrective Action
200/204	Action completed successfully	NA
304	No changes applied	Update as required
400	Bad request parameter	Retry with valid parameters
401	Authentication required	Provide authentication parameters. For example, X-Authorization key
403	Unauthorized access	Ensure you are authorized to access the Enterprise Control Room
404	Not found	Ensure that the request payload is available in Enterprise Control Room
409	Conflict	Ensure the parameters provided are correct
500	Internal server error	Ensure the server is up and running
501	Permission error	Ensure that you have the required permission

## Audit Logs

The deployment activity using the API is logged in the Enterprise Control Room Audit Log page. As a Enterprise Control Room administrator or a user with View everyone's audit log actions, you can view the audit entries.

## Bot Insight Data API

Get bot process data for analytic analysis. Only users with Bot Insight administration role can access this API.

The Bot Insight Data API endpoints are listed here. Click the request example to view detailed request and response information.

#### Bot Insight audit trail data

```
/v1/botinsight/data/api/getaudittrailedata/0/${DateValue}
```

Make a GET request to retrieve all of the Enterprise Control Room audit trail data.

#### Bot Insight task meta data

```
/v1/botinsight/data/api/gettaskmetadata/Analytics_ATM_Reconciliation
```

Make a GET request to retrieve task meta data for the specified task.

#### Bot Insight task variable profile

```
/v1/botinsight/data/api/gettaskvariableprofile/${JobName}?from=${DateValue}&to=${DateValue}
```

Make a GET request to retrieve the Enterprise Control Room variable profile for the specified dates.

#### Bot Insight task log data

```
/v1/botinsight/data/api/gettasklogdata/${JobName}/0/${DateValue}
```

Make a GET request to retrieve detailed information on the specified task log.

#### Bot Insight bot run data

```
/v1/botinsight/data/api/getbotrundata/1/${DateValue}
```

Make a GET request to retrieve bot data for a specific date or date range

#### Bot Insight audit trail data

Make a GET request to retrieve all of the Enterprise Control Room audit trail data.

### Request

```
GET http://{{localhost}}/v1/botinsight/data/api/getaudittrailedata/0/2019-02-05
```

```
Header: X-Authorization <>authentication token<>
```

All API calls must contain an authentication token in the request header. Generate a token with the [Enterprise Control Room API for Authentication](#).

## Response

```
{
  "totalRecords": 567,
  "auditTrailDataList": [
    {
      "activityType": "DELETE_BOT",
      "createdBy": "0",
      "createdOn": "2019-02-05T23:34:33.000Z",
      "detail": "[{\\"newValue\\":\"My Tasks > Sample Tasks > Analytics_TelecomOrderEntry.atmx\", \\"attribute\\\":\"Path\", \\"oldValue\\\":null}, {\\"newValue\\\":\"Bot\\\", \\"attribute\\\":\"Object type\\\", \\"oldValue\\\":null}, {\\"newValue\\\":\"Taskbot\\\", \\"attribute\\\":\"Bot type\\\", \\"oldValue\\\":null}]",
      "environmentName": "",
      "eventDescription": "",
      "hostName": "50.225.245.66",
      "id": "1bEDwGgBIjZXN_SOYNZJ",
      "objectName": "Analytics_TelecomOrderEntry.atmx",
      "requestId": "12f5a941-a77d-4950-b919-a91cd3fffc0b5",
      "source": "Control Room",
      "status": "Successful",
      "userName": "DRTEST\\admin"
    },
    {
      "activityType": "RUN_BOT_ENDED",
      "createdBy": "0",
      "createdOn": "2019-02-05T23:34:03.000Z",
      "detail": "[{\\"newValue\\\":\"Completed\\\", \\"attribute\\\":\"Automation status\\\", \\"oldValue\\\":null}, {\\"newValue\\\":\"Task_05.19.02.05.15.32.15.admin\\\", \\"attribute\\\":\"Automation name\\\", \\"oldValue\\\":null}, {\\"newValue\\\":\"--\\\", \\"attribute\\\":\"Automation description\\\", \\"oldValue\\\":null}, {\\"newValue\\\":\"Task_05.atmx\\\", \\"attribute\\\":\"Bot\\\", \\"oldValue\\\":null}]"
    }
  ]
}
```

```
\" : null }, { \"newValue\" : \"abcdef.com\" , \"attribute\" : \"Device\" , \"oldValue\" : null }, { \"newValue\" :  
\"testrunneruser\" , \"attribute\" : \"Username\" , \"oldValue\" : null }, { \"newValue\" :  
\"2019-02-05  
15:34:03 PST\" , \"attribute\" : \"Started  
on\" , \"oldValue\" : null }, { \"newValue\" : \"5\" , \"attribute\" : \"Line  
number\" , \"oldValue\" : null }, { \"newValue\" : \"One time\" , \"attribute\" : \"Schedule  
Type\" , \"oldValue\" : null } ] ,  
\"environmentName\" : \"\" ,  
\"eventDescription\" : \"\" ,  
\"hostName\" : \"abcdef.com\" ,  
\"id\" : \"1LECwGgBIjZXN_SO7dzi\" ,  
\"objectName\" : \"Task_05.19.02.05.15.32.15.admin\" ,  
\"requestId\" : \"a73eef1f-5aa9-4345-8ae8-e6f2e24ab41e\" ,  
\"source\" : \"Control Room\" ,  
\"status\" : \"Successful\" ,  
\"userName\" : \"System\"  
} ,  
{  
\"activityType\" : \"DEPLOYMENT_AUTOMATION\" ,  
\"createdBy\" : \"0\" ,  
\"createdOn\" : \"2019-02-05T23:34:00.000Z\" ,  
\"detail\" : [ { \"newValue\" : \"Task_05.19.02.05.15.32.15.admin\" , \"attribute\" : \"A  
utomation  
name\" , \"oldValue\" : null } , { \"newValue\" : \"Task_05.atmx\" , \"attribute\" : \"Bot\" ,  
\"oldValue\" : null } ] ,  
{ \"newValue\" : \"abcdef.com\" , \"attribute\" : \"Device\" , \"oldValue\" : null } , { \"newValue\" :  
\"test  
runneruser\" , \"attribute\" : \"Username\" , \"oldValue\" : null } , { \"newValue\" : \"2019  
-02-05 15:34:00  
PST\" , \"attribute\" : \"Started on\" , \"oldValue\" : null } , { \"newValue\" : \"One  
time\" , \"attribute\" : \"Schedule Type\" , \"oldValue\" : null } ] ,  
\"environmentName\" : \"\" ,  
\"eventDescription\" : \"\" ,  
\"hostName\" : \"abcdef.com\" ,  
\"id\" : \"Gf4CwGgBv9m2c9mi4XaL\" ,
```

```

"objectName": "Task_05.19.02.05.15.32.15.admin",
"requestId": "8927dc37-67eb-4f8f-8e13-3a60c6070fd3",
"source": "Control Room",
"status": "Successful",
"userName": "System"
},
.....
]
}

```

## Bot Insight task meta data

Make a GET request to retrieve task meta data for the specified task.

### Request

```
GET http://{{localhost}}/v1/botinsight/data/api/gettaskmetadata/Analytics_ATM  
Reconciliation
```

```
Header: X-Authorization <>authentication token<>
```

All API calls must contain an authentication token in the request header. Generate a token with the [Enterprise Control Room API for Authentication](#).

### Response

```
[
{
  "attributeType": "STRING",
  "variableName": "amount",
  "displayName": "Amount",
  "isActive": "Y",
  "isAttributeTypeChanged": "N",
  "isInUse": "N",
  "mappedToColumn": 2,
  "dateModified": 1549490723370,
  "isEnabled": "Y",
}
```

```
        "newlyAdded": null,
        "taskId": null
    },
{
    "attributeType": "STRING",
    "variableName": "bank_name",
    "displayName": "Bank Name",
    "isActive": "Y",
    "isAttributeTypeChanged": "N",
    "isInUse": "N",
    "mappedToColumn": 3,
    "dateModified": 1549490723370,
    "isEnabled": "Y",
    "newlyAdded": null,
    "taskId": null
},
{
    "attributeType": "STRING",
    "variableName": "card_type",
    "displayName": "Card Type",
    "isActive": "Y",
    "isAttributeTypeChanged": "N",
    "isInUse": "N",
    "mappedToColumn": 4,
    "dateModified": 1549490723370,
    "isEnabled": "Y",
    "newlyAdded": null,
    "taskId": null
},
{
    "attributeType": "STRING",
    "variableName": "country_code",
    "displayName": "Country Code",
    "isActive": "Y",
    "isAttributeTypeChanged": "N",
    "isInUse": "N",
```

```
"mappedToColumn": 5,
"dateModified": 1549490723370,
"isEnabled": "Y",
"newlyAdded": null,
"taskId": null
},
{
  "attributeType": "STRING",
  "variableName": "reason",
  "displayName": "Reason",
  "isActive": "Y",
  "isAttributeTypeChanged": "N",
  "isInUse": "N",
  "mappedToColumn": 10,
  "dateModified": 1549490723370,
  "isEnabled": "Y",
  "newlyAdded": null,
  "taskId": null
},
{
  "attributeType": "STRING",
  "variableName": "state_code",
  "displayName": "State Code",
  "isActive": "Y",
  "isAttributeTypeChanged": "N",
  "isInUse": "N",
  "mappedToColumn": 6,
  "dateModified": 1549490723370,
  "isEnabled": "Y",
  "newlyAdded": null,
  "taskId": null
},
{
  "attributeType": "STRING",
  "variableName": "status",
  "displayName": "Status",
```

```
"isActive": "Y",
"isAttributeTypeChanged": "N",
"isInUse": "N",
"mappedToColumn": 7,
"dateModified": 1549490723370,
"isEnabled": "Y",
"newlyAdded": null,
"taskId": null
},
{
"attributeType": "STRING",
"variableName": "transaction_date",
"displayName": "Transaction Date",
"isActive": "Y",
"isAttributeTypeChanged": "N",
" isInUse": "N",
"mappedToColumn": 8,
"dateModified": 1549490723370,
"isEnabled": "Y",
"newlyAdded": null,
"taskId": null
},
{
"attributeType": "STRING",
"variableName": "transaction_type",
"displayName": "Transaction Type",
"isActive": "Y",
"isAttributeTypeChanged": "N",
" isInUse": "N",
"mappedToColumn": 9,
"dateModified": 1549490723370,
"isEnabled": "Y",
"newlyAdded": null,
"taskId": null
},
{
```

```

    "attributeType": "NUMERIC",
    "variableName": "zip_code",
    "displayName": "Zip Code",
    "isActive": "Y",
    "isAttributeTypeChanged": "N",
    "isInUse": "N",
    "mappedToColumn": 1,
    "dateModified": 1549490723370,
    "isEnabled": "Y",
    "newlyAdded": null,
    "taskId": null
  }
]

```

## Bot Insight task variable profile

Make a GET request to retrieve the Enterprise Control Room variable profile for the specified dates.

### Request

```

GET http://{{localhost}}/v1/botinsight/data/api/gettaskvariableprofile/Analytics_ATM_Reconciliation?from=2019-01-31&to=2019-02-05

```

```
Header: X-Authorization <<authentication token>>
```

All API calls must contain an authentication token in the request header. Generate a token with the [Enterprise Control Room API for Authentication](#).

### Response

```
{
  "taskId": "94c23a0a-fe84-4f00-8cbc-28253acff30e",
  "taskName": "Analytics_ATM Reconciliation",
  "totalRecords": 1000,
  "profileVariables": [
    {

```

```
"variableName": "amount",
"displayName": "Amount",
"mappedToColumnName": "string2",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 0,
"sumOfValue": 0,
"averageOfValues": 0,
"totalDistincts": 766,
"newlyAdded": null,
"enabled": null
},
{
"variableName": "bank_name",
"displayName": "Bank Name",
"mappedToColumnName": "string3",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 0,
"sumOfValue": 0,
"averageOfValues": 0,
"totalDistincts": 5,
"newlyAdded": null,
"enabled": null
},
{
"variableName": "card_type",
"displayName": "Card Type",
"mappedToColumnName": "string4",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 0,
"sumOfValue": 0,
```

```
"averageOfValues": 0,
"totalDistincts": 16,
"newlyAdded": null,
"enabled": null
},
{
"variableName": "country_code",
"displayName": "Country Code",
"mappedToColumnName": "string5",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 0,
"sumOfValue": 0,
"averageOfValues": 0,
"totalDistincts": 1,
"newlyAdded": null,
"enabled": null
},
{
"variableName": "reason",
"displayName": "Reason",
"mappedToColumnName": "string10",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 1,
"sumOfValue": 0,
"averageOfValues": 0,
"totalDistincts": 4,
"newlyAdded": null,
"enabled": null
},
{
"variableName": "state_code",
"displayName": "State Code",
```

```
"mappedToColumnName": "string6",
"attributeType": "STRING",
"isAttributeTypeChanged": "N",
"totalRecords": 1000,
"totalNullRecords": 0,
"sumOfValue": 0,
"averageOfValues": 0,
"totalDistincts": 48,
"newlyAdded": null,
"enabled": null
},
{
  "variableName": "status",
  "displayName": "Status",
  "mappedToColumnName": "string7",
  "attributeType": "STRING",
  "isAttributeTypeChanged": "N",
  "totalRecords": 1000,
  "totalNullRecords": 0,
  "sumOfValue": 0,
  "averageOfValues": 0,
  "totalDistincts": 2,
  "newlyAdded": null,
  "enabled": null
},
{
  "variableName": "transaction_date",
  "displayName": "Transaction Date",
  "mappedToColumnName": "string8",
  "attributeType": "STRING",
  "isAttributeTypeChanged": "N",
  "totalRecords": 1000,
  "totalNullRecords": 0,
  "sumOfValue": 0,
  "averageOfValues": 0,
  "totalDistincts": 3,
```

```
        "newlyAdded": null,
        "enabled": null
    },
    {
        "variableName": "transaction_type",
        "displayName": "Transaction Type",
        "mappedToColumnName": "string9",
        "attributeType": "STRING",
        "isAttributeTypeChanged": "N",
        "totalRecords": 1000,
        "totalNullRecords": 0,
        "sumOfValue": 0,
        "averageOfValues": 0,
        "totalDistincts": 240,
        "newlyAdded": null,
        "enabled": null
    },
    {
        "variableName": "zip_code",
        "displayName": "Zip Code",
        "mappedToColumnName": "string1",
        "attributeType": "NUMERIC",
        "isAttributeTypeChanged": "N",
        "totalRecords": 1000,
        "totalNullRecords": 0,
        "sumOfValue": 400979,
        "minimumValue": "10",
        "maximumValue": "800",
        "averageOfValues": 400.979,
        "totalDistincts": 575,
        "newlyAdded": null,
        "enabled": null
    }
],
"standardDashboardName": null
}
```

## Bot Insight task log data

Make a GET request to retrieve detailed information on the specified task log.

### Request

```
GET http://{{localhost}}/v1/botinsight/data/api/gettasklogdata/Analytics_ATM  
Reconciliation/0/2019-02-05
```

```
Header: X-Authorization <>authentication token<>
```

All API calls must contain an authentication token in the request header. Generate a token with the [Enterprise Control Room API for Authentication](#).

### Response

```
{  
  "totalRecords": 1,  
  "taskLogDataList": [  
    {  
      "machineName": "WIN-4MBO81V7Q7T",  
      "runStatus": "InProgress",  
      "userId": 1,  
      "dateLogged": 1549330489334,  
      "variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"Withdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"  
    },  
    {  
      "totalRecords": 1,  
      "taskLogDataList": [  
        {  
          "machineName": "WIN-4MBO81V7Q7T",  
          "runStatus": "CompletedSuccessfully",  
          "userId": 1,  
          "dateLogged": 1549330489334,  
          "variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"Withdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"  
        }  
      ]  
    }  
  ]  
}
```

```
"dateLogged": 1549330489334,
"variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"\nWithdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"
},
{
"totalRecords": 1,
"taskLogDataList": [
{
"machineName": "WIN-4MBO81V7Q7T",
"runStatus": "Aborted",
"userId": 1,
"dateLogged": 1549330489334,
"variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"\nWithdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"
},
{
"totalRecords": 1,
"taskLogDataList": [
{
"machineName": "WIN-4MBO81V7Q7T",
"runStatus": "Failed",
"userId": 1,
"dateLogged": 1549330489334,
"variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"\nWithdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"
},
{
}
```

```

"totalRecords": 1,
"taskLogDataList": [
{
"machineName": "WIN-4MBO81V7Q7T",
"runStatus": "TimedOut",
"userId": 1,
"dateLogged": 1549330489334,
"variables": "{\"amount\":\"65898\", \"bank_name\":\"Bank of America\", \"card_type\":\"jcb\", \"country_code\":\"United States\", \"reason\":\"\", \"state_code\":\"Missouri\", \"status\":\"Matched\", \"transaction_date\":\"Withdrawal\", \"transaction_type\":\"1499817600000\", \"zip_code\":\"10\" }"
}

```

## Bot Insight bot run data

Make a GET request to retrieve bot data for a specific date or date range.

### Request

```
GET http://{{localhost}}/v1/botinsight/data/api/getbotrundata/0/2019-02-05
```

```
Header: X-Authorization <>authentication token<>
```

All API calls must contain an authentication token in the request header. Generate a token with the [Enterprise Control Room API for Authentication](#).

### Response

```
{
"totalRecords": 367,
"botRunDataList": [
{
"id": 1,
"userName": "b2",
"firstName": "b2",
"lastName": null,
```

```
"email": "a@a.com",
"clientType": null,
"hostName": "abcdef.com",
"IPAddress": "fe80::c9a4:eecb:aeb5:58a1%Ethernet",
"applicationPath": "C:\\\\Users\\\\chandank.DRTEST\\\\Documents\\\\Automation Anywhere Files",
"username_1": null,
"fileName": "Analytics_ATM Reconciliation.atmx",
"fileType": null,
"startTime": "2019-02-05 00:35:30.0",
"endTime": "2019-02-05 00:35:40.0",
"status": "COMPLETED",
"totalLines": "24",
"timeTaken": "10",
"successIndicator": "0"
},
{
"id": 2,
"userName": "b2",
"firstName": "b2",
"lastName": null,
"email": "a@a.com",
"clientType": null,
"hostName": "QAVM01.drtest.com",
"IPAddress": "fe80::c9a4:eecb:aeb5:58a1%Ethernet",
"applicationPath": "C:\\\\Users\\\\chandank.DRTEST\\\\Documents\\\\Automation Anywhere Files",
"username_1": null,
"fileName": "Analytics_MortgageProcessing.atmx",
"fileType": null,
"startTime": "2019-02-05 00:44:55.0",
"endTime": "2019-02-05 00:45:07.0",
"status": "COMPLETED",
"totalLines": "34",
"timeTaken": "12",
"successIndicator": "0"
```

```
},
{
  "id": 3,
  "userName": "b2",
  "firstName": "b2",
  "lastName": null,
  "email": "a@a.com",
  "clientType": null,
  "hostName": "abcdef.com",
  "iPAddress": "fe80::c9a4:eecb:aeb5:58a1%Ethernet",
  "applicationPath": "C:\\\\Users\\\\chandank.DRTEST\\\\Documents\\\\Automation Anywhere Files",
  "username_1": null,
  "fileName": "Analytics_ATM Reconciliation.atmx",
  "fileType": null,
  "startTime": "2019-02-05 01:17:02.0",
  "endTime": "2019-02-05 01:17:13.0",
  "status": "COMPLETED",
  "totalLines": "24",
  "timeTaken": "11",
  "successIndicator": "0"
},
{
  "id": 4,
  "userName": "b2",
  "firstName": "b2",
  "lastName": null,
  "email": "a@a.com",
  "clientType": null,
  "hostName": "abcdef.com",
  "iPAddress": "fe80::c9a4:eecb:aeb5:58a1%Ethernet",
  "applicationPath": "C:\\\\Users\\\\chandank.DRTEST\\\\Documents\\\\Automation Anywhere Files",
  "username_1": null,
  "fileName": "Analytics_MortgageProcessing.atmx",
  "fileType": null,
```

```

    "startTime": "2019-02-05 01:17:13.0",
    "endTime": "2019-02-05 01:17:26.0",
    "status": "COMPLETED",
    "totalLines": "34",
    "timeTaken": "13",
    "successIndicator": "0"
},
. . .
]
}

```

## API to add and remove manual dependencies

Use the Manual Dependencies API to manually add and/or remove dependent files to/from a TaskBot from My Docs, My Exes, and My Scripts folders in the repository.

As a Enterprise Control Room administrator or a user with View and Manage Scheduled Activity permission, you can manage dependencies manually. The Manual Dependencies APIs allow you to,

1. Add dependent files to a parent TaskBot
2. Remove dependent files from a parent TaskBot

Note: The examples provided in this article are for reference only.

Before accessing the Dependencies API's you must first use the authentication API and pass it as a token to use a particular API.

1. Use the POST method to generate a token using the end point `http(s)://<hostname:port>/v1/authentication`. For this provide the Enterprise Control Room instance as Server Name /Hostname /IP and the Port number.

For example, `https://crdevenv.com:81/v1/authentication`

2. Provide the following request payload in Headers

`"X-Authorization" : "Authorization token"`

`"Content-Type" : "application/json"`

3. Provide the following request payload in Body:

```
{
  "username": "<Username>",
  "password": "<Password>"}
```

```
}
```

For example,

```
{
  "username": "Ellie.Brown",
  "password": "12345678"
}
```

## API to add dependent files

Use this API to add files to a parent TaskBot for run and deploy automation successfully.

### API end point

Use the following end point to access the APIs:

<Enterprise Control Room URL>/v1/files/manualdependencies/add

For example,

<https://crdevenv.com:81/v1/files/manualdependencies/add>

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the Deployment API to fetch the list of files available in the repository. Refer the section on [API to fetch bot details](#) for details.
3. Use the POST method to provide the file ids as request payload in Body:

```
{
  "id": <parent file id>,
  "child_ids": [ <dependent file id 1>, <dependent file id 2> ]
}
```

- For example, the following adds the dependent files with ids <...> for the TaskBot with id <..>:

```
{
  "id":10
  "child_ids":[18, 19]
}
```

4. Click Send
5. The action is successful when the response status is 200.
6. You can view the response in the Body data.

## Parameter Description

Parameter	Description
id	parent file id
child_ids	Collection of child manual dependency ids.

## API to remove dependent files

Use this API to remove dependent files from a parent TaskBot.

### API end point

Use the following end point to access the APIs:

<Enterprise Control Room URL>/v1/files/manualdependencies/remove

For example, <https://crdevenv.com:81/manualdependencies/remove>

1. Provide the "X-Authorization" and "Content Type" parameters in Headers.
2. Use the DELETE method to provide the following request payload in Body:

```
{
  "id": 0,
  "child_ids": 0
}
```

- For example, the following removes/deletes the dependent files with ids <...> for the TaskBot with id <..>:

```
{
  "id":
  "child_ids":
}
```

3. Click Send
4. The action is successful when the response status is 200
5. You can view the response in the Body data.

## Parameter Description

Parameter	Description
id	parent file id

Parameter	Description
child_ids	Collection of child manual dependency ids.

## Filters in an API request body

Filtering provides basic conditional queries and page control for processing web pages. There are 3 basic features related to filtering: filtering conditions, sorting columns, and pagination parameters.

Here is an example of the JSON filtering structure using all 3 of the basic features.

```
{
  "filter": {
    "operator": "NONE",
    "operands": [
      null
    ],
    "field": "string",
    "value": "string"
  },
  "sort": [
    {
      "field": "string",
      "direction": "asc"
    }
  ],
  "page": {
    "offset": 0,
    "length": 0
  }
}
```

### Filter

Filtering can be a simple conditional evaluation of a single field, for example:

```
createdOn > 2019-01-0108:00:00:000Z
```

The field "cretedOn" and its value are operands. The greater than sign is the operator. This example would find all rows in a table that were created after January 1, 2019 after 8:00 AM.

```

"filter": {
    "operator": ">",
    "operands": [
        ],
    "field": "createdOn",
    "value": "2019-01-01T08:00:00Z"
}

```

## Operator

- Type: String
- Enum: NONE, lt, le, eq, ne, ge, gt, substring, and, or, not

## Operands

- Field
  - Type: String
  - Value: The field name to filter on.
- Value
  - Type: String
  - Value: An appropriate value for the field you are filtering on. Fields are specific to the API and the fields in the table.

## PageRequest

```

"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"
  }
]
```

- Field

Type: string

The name of the field to use for sorting.

- Direction
  - asc = ascending (smallest to largest, 0 to 9, A to Z)
  - desc = descending (largest to smallest, 9 to 0, Z to A)

## SortItem

When used, the sortItem is embedded in the sort feature.

```
{
  field string
  Enum: [
    createdOn
  ]
  direction string
  Enum: [
    desc,
    asc
  ]
}
```

- Field

Type: Enum [ createOn ]

- Direction

Type: Enum [ desc, asc ]

## Control room troubleshooting issues

Known troubleshooting issues and solutions related to the control room are documented here. Use the Send Feedback option at the bottom of every content page to provide constructive feedback and suggestions.

- [Troubleshooting bot deployment](#)

Issue: I'm unable to deploy a bot because I get the following – Cannot run this interactive bot <bot name> at this time as another interactive bot is currently running.

- [Troubleshooting Automation File Permissions](#)

Issue: When you upload an automation file from Enterprise client in a distributed environment, the following error message appears – Storage does not exists for job <job number>.

## Troubleshooting bot deployment

Issue: I'm unable to deploy a bot because I get the following – Cannot run this interactive bot <bot name> at this time as another interactive bot is currently running.

Cause:

Bots must be deployed one at a time. You cannot deploy more than one bot concurrently.

Solution:

Wait until the other bot finishes deploying then deploy your bot again. You can see bot deployment statuses from the In-progress activity page of the Enterprise Control Room.

Related concepts

[In progress activity](#)

## Troubleshooting Automation File Permissions

Issue: When you upload an automation file from Enterprise client in a distributed environment, the following error message appears – Storage does not exists for job <job number>.

Cause:

This issue is caused by one of the following reasons –

- The Enterprise Control Room installation wizard did not create the folder where the automation files will be uploaded.
- The folder where the automation files are to be uploaded does not have the required shared permission.

Solution:

1. Verify that the folder where the Automation Anywhere files are to be uploaded is created.

For example, if you installed the client in the default location, you can open Windows Explorer and navigate to your C drive, Program Files. From here, you should see the Automation Anywhere folder.

2. Apply the Enable inheritance and shared permissions to the folder.

a) Right-click the folder and click Properties.

The Folder Properties dialog box appears.

- b) Select the Security tab and then click Advanced.

The Advanced Security Settings dialog box appears.

- c) Click Enable Inheritance, then click Apply.

- [Restrict upload of malicious files](#)

As a Enterprise Control Room Administrator you can add file extensions to the configuration file that restricts the Bot user from uploading files that have extensions other than the ones whitelisted in it.

- [Files to be added to anti-virus exceptions list](#)

This article provides list of Automation Anywhere files that need to be added to the anti-virus list.

- [Recover schedules post upgrade](#)

A user with scheduling permissions can recover the list of schedules that might have missing from the Schedules page after migrating to Automation Anywhere version 11.3 .

- [Troubleshoot Active Directory multi-forest Control Room](#)

Use this topic as a reference to troubleshoot issues that you encounter in an Enterprise Control Room configured in Active Directory (AD) multi-forest environment.

- [Update deployment settings file to maintain Remote Desktop session](#)

In case of network fluctuations, a system administrator is able to manage the continuity of the organization's Remote Desktop Protocol (RDP) session by customizing the Automation Anywhere Enterprise Control Room deployment properties file.

## Restrict upload of malicious files

As a Enterprise Control Room Administrator you can add file extensions to the configuration file that restricts the Bot user from uploading files that have extensions other than the ones whitelisted in it.

This will help restrict uploading of malicious files to the Enterprise Control Room repository. To whitelist files,

1. Open the config folder from Enterprise Control Room installation path.

For example, C:\Program Files\Automation Anywhere\Enterprise\config

2. Open the repository.properties file in edit mode; preferably in Run as administrator mode.

3. Update "repository.whitelisted.file.extensions=" to include the files. Add the extensions separated by a comma (,)

For example, repository.whitelisted.file.extensions=atmx,mbot,csv

- a) To allow files with all extensions, use asterisk (\*)
- b) DO NOT add space between the extension names
- c) If using load balancer, update the config file in all nodes

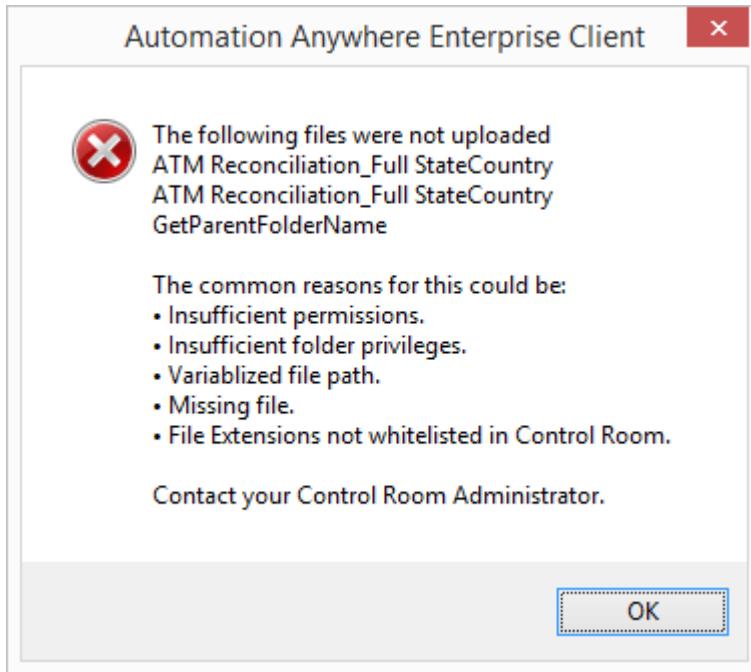
4. Using POST method execute the Authentication API.

The token passed through this API has to be used for the next step. Refer article on [Authentication API](#) for details.

5. Using the PUT method execute the API http(s)://{{hostname}}:{{port}}/v1/repository/fileExtensions/update

For example, <https://ultron.com:81/v1/repository/fileExtensions/update>

6. On successful implementation, when a bot user attempts to upload files that are not part of the whitelist from the Enterprise client, the following message is shown in Enterprise client,



## Files to be added to anti-virus exceptions list

This article provides list of Automation Anywhere files that need to be added to the anti-virus list.

All Enterprise Control Room binary files are digitally signed with Automation Anywhere company's certificate. This adds to security at binary level. This also means that all product files are not detected as a virus by your enterprise anti-virus.

However, if for some reason, there are exceptions, you can add the following .exe files to the exceptions list of the anti-virus installed on your computer.

Table 1. Files for anti-virus exceptions list

Path/Location	Filename
<install location>\traefik  For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\traefik	<ul style="list-style-type: none"> <li>• traefik.exe</li> </ul>
<install location>\service  For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\service	<ul style="list-style-type: none"> <li>• AutomationAnywhere.Controlroom.Service.exe</li> </ul>

Path/Location	Filename
<install location>\rdp  For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\rdp	<ul style="list-style-type: none"> <li>• AARemoteMachineConnector.exe</li> </ul>
<install location>\nssm  For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\nssm.exe	<ul style="list-style-type: none"> <li>• nssm.exe</li> </ul>
<install location>\jre\bin  For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\jre\bin\jabswitch.exe	<ul style="list-style-type: none"> <li>• jabsswitch.exe</li> <li>• java.exe</li> <li>• javacpl.exe</li> <li>• java-rmi.exe</li> <li>• javaw.exe</li> <li>• javaws.exe</li> <li>• jjs.exe</li> <li>• jp2launcher.exe</li> <li>• keytool.exe</li> <li>• kinit.exe</li> <li>• klist.exe</li> <li>• ktab.exe</li> <li>• orbd.exe</li> <li>• pack200.exe</li> <li>• unpack200.exe</li> <li>• policytool.exe</li> <li>• rmid.exe</li> <li>• rmiregistry.exe</li> <li>• servertool.exe</li> <li>• ssvagent.exe</li> <li>• tnameserv.exe</li> </ul>

## Recover schedules post upgrade

A user with scheduling permissions can recover the list of schedules that might have missing from the Schedules page after migrating to Automation Anywhere version 11.3 .

## Prerequisites

Ensure the user who is performing the recovery has access to the Control Room database as a query to search the schedules should be executed. Also, if multiple schedules are involved, you need to use a REST API to perform a deactivate action.

### How to recover schedules

Once you have migrated to Automation Anywhere Version 11.3, if you notice that your schedules are not listed in the Schedules page, you must follow certain steps to recover those so that your automation can continue without interruption.

To summarize, you must first search for the schedules that are missing, login to the Control Room, deactivate the schedules, and re-activate or delete the schedules.

## Procedure

1. To search for missing schedules execute the following SQL query on the Control Room database,

```

SELECT
    a_schedule.id
FROM
    automation_schedule
        a_schedule
JOIN automations automations ON
    automations.id = a_schedule.id
WHERE
(
    (a_schedule.next_run_datetime
        < Sysutcdatetime() OR a_schedule.next_run_datetime is
        null)
    AND automations.status =
        1
)

```

Note: Upon execution, the SQL query returns the list of missing schedule ids. Use these schedule ids to perform steps shown below to recover your missing schedules.

2. You can now choose to deactivate the schedules one at a time using a URL or in bulk using a REST API.

- Deactivate schedules one at a time using URL

- a) Login to Control Room -

```
http(s)://<hostname>:<port>
```

- b) Type the URL to view the Schedule details page -

```
http(s)://<hostname:port>/#/activity/scheduled/<missing_schedule_id>/view
```

For example for the missing schedule with id 12, use -

```
https://localhost:8081/#/activity/scheduled/12/view
```

- c) Click Deactivate button given at the top of the page.

- d) Repeat steps b and c for other missing schedules.
- Deactivate schedules in bulk using REST API
  - a) Use the [Enterprise Control Room API for Authentication](#) to logon to the Control Room.
  - b) Use Put method -
 

```
HTTP PUT
```
  - c) Use Request URL -
 

```
http(s)://<hostname>:<port>/v1/schedule/automations/deactivate
```

For example,

```
https://localhost:8081/v1/schedule/automations/deactivate
```

d) Provide authorization token -

```
Header: X-Authorization  
token
```

e) Specify content type -

```
Content-Type:  
application/json
```

f) Provide schedule ids in body data -

```
Body:  
[<missing_schedule_id1,  
missing_schedule_id2,..missing_schedule_i  
dn>]
```

For example,

```
Body: [12, 13, 14, 15, 16,  
20]
```

3. Go to Control Room to view the missing schedules in the Schedules page
4. Select the check box beside the required schedule to Activate or Delete multiple schedules .

#### Related reference

[Activate or deactivate a scheduled activity](#)

[Delete a schedule](#)

## Troubleshoot Active Directory multi-forest Control Room

Use this topic as a reference to troubleshoot issues that you encounter in an Enterprise Control Room configured in Active Directory (AD) multi-forest environment.

#### Issues, possible causes and solution

Issue	Cause	Solution
KrbException: Server not found in Kerberos database (7)	The hostname used in the LDAP URL is pointing to the load balancer and not FQHN	Point the hostname used in the LDAP URL to FQHN
javax.security.auth.login.LoginException: Client not found in Kerberos database (6)	Username is incorrect	Type the username that is present in the Kerberos database
LDAP: error code 49 - 8009030C: LdapErr: DSID-0C09056D, comment:	Error code 52e - incorrect password could be due to many	The AD admin can check the DNS settings

Issue	Cause	Solution
AcceptSecurityContext error, data 52e, v2580	other issues such as DNS setup in the <a href="#">Active Directory</a> (AD).	
[Krb5LoginModule] authentication failed or javax.security.auth.login.LoginException: null (68)	Domain in the username is not in uppercase. For example, john@ENTERPRISECR.COM Domain name not being resolved can cause this as DNS is not able to find the KDC	Type the username in uppercase. For example, JOHN@ENTERPRISECR.COM
javax.security.auth.login.LoginException: Pre-authentication information was invalid (24)	Invalid password	Type the correct password
GSS initiate failed [Caused by GSSEException: No valid credentials provided (Mechanism level: Fail to create credential. (63) - No service creds)]	FQHN is not used in the LDAP URL	Use FQHN in the LDAP URL
javax.security.auth.login.LoginException: Clock skew too great (37)	The system clock between the Control Room host and AD host is not synchronized; by default it is 5 minutes.	The AD admin can check the attribute on the AD side
java.net.SocketException: Connection reset	Network connection issue between the Control Room host and AD host	The system admin can check the network connection between the Control Room host and AD host.

## System Commands on AD host

Following system commands can be run on the AD host to:

- Check Kerberos Distribution Center (KDC) is running:

```
nslookup -type=srv _kerberos._tcp.ENTERPRISECR.COM
```

- Check GC is running:

```
nslookup -type=srv _gc._tcp.ENTERPRISECR.COM
```

- Check LDAP is running:

```
nslookup -type=srv _ldap._tcp.ENTERPRISECR.COM
```

- Check domain trust:

```
nltest /domain_trusts
```

- Show details of a specific domain:

```
nltest /dsgetdc:ENTERPRISECR.COM
```

- [Custom defined Key Distribution Centers \(KDC\)](#)

When one or more Key Distribution Centers (KDCs) are inaccessible resulting in delayed or no response and the domain list is shown empty, an Enterprise Control Room administrator follows certain steps to define the KDCs in the um.properties file.

- [Guidelines to set up service users for auto discovery mode](#)

Enable the Automation Anywhere Enterprise Control Room to discover and list domains and sites in an organization. Use this topic as reference to resolve issues that arise during creation of service users.

#### Related tasks

[Custom defined Key Distribution Centers \(KDC\)](#)

#### Related reference

[Guidelines to set up service users for auto discovery mode](#)

## Custom defined Key Distribution Centers (KDC)

When one or more Key Distribution Centers (KDCs) are inaccessible resulting in delayed or no response and the domain list is shown empty, an Enterprise Control Room administrator follows certain steps to define the KDCs in the um.properties file.

An Enterprise Control Room administrator is allowed to manually define KDCs in um.properties file so the request is forwarded only to the defined KDCs.

To define the KDCs in um.properties file:

### Procedure

1. Run the command to determine the KDCs for the domain

```
nslookup -type=srv _kerberos._tcp.MYDOMAIN.COM where MYDOMAIN.COM is the domain.
```

It lists all the KDCs in\_kerberos.\_tcp.AAI.MYDOMAIN.COM SRV service location:

```
priority = 0
weight = 100
port = 88
svr hostname = hostname2.aai.mydomain.com
_kerberos._tcp.AAI.MYDOMAIN.COM SRV service location:
```

```

priority = 0
weight = 100port = 88
svr hostname = hostname2.aai.mydomain.com
_kerberos._tcp.AAI.MYDOMAIN.COM SRV service location:
priority = 0
weight = 100
port = 88
svr hostname = hostname1.aai.mydomain.com
svr hostname = hostname2.aai.mydomain.com

```

2. Look for the file - um.properties in the installation directory
3. Append the following entry:

```

um.ldap.kdcs='AAI.MYDOMAIN.COM:sjcsrvbkp.aai.mydomain.com:sjcsrv.aai.mydom
ain.com'

```

Tip:

- Domain has to be the first token and followed by one or more KDCs and separated by colons.
- Each domain is separated by commas. For example, the following has 2 domains; the first domain has 3 KDCs and the second domain has 2 KDCs

```

um.ldap.kdcs='domain1.com:host1.domain1.com:host2.domain1.com:host3.do
main1.com, domain2.com:host1.domain2.com:host2.domain2.com'

```

This will force the request to be forwarded to either one of the two KDCs for this domain. If the domain in the LDAP URL is different than the username or more domains will need to be supported, all domains with the corresponding KDCs need to be defined in that entry.

See details below on constructing the entry:

- a) Clear the cache
- b) Restart the Automation Anywhere Enterprise Control Room services

Related reference

[Guidelines to set up service users for auto discovery mode](#)

## Guidelines to set up service users for auto discovery mode

**11.3.2** Enable the Automation Anywhere Enterprise Control Room to discover and list domains and sites in an organization. Use this topic as reference to resolve issues that arise during creation of service users.

Follow the below guidelines to resolve issues when you are creating service users:

- It is recommended to create a service user in a parent domain.
- If Key Distribution Centers (KDCs) are already defined in um.properties file, comment out the um.ldap.kdcs entry by putting a '#' in the front of the entry. This allows the auto discovery process to auto discover all the KDCs.
- If the above does not work, remove the comment for um.ldap.kdcs entry and define KDCs for all domains across all the forests. For this the AD admin has to be involved on the full list of domains in your AD system.
- If KDC is not defined in um.properties file, try to define one with all the KDCs for all domains across all forests.

See [Custom defined Key Distribution Centers \(KDC\)](#) for details on setting up KDCs in um.properties file.

Related tasks

[Custom defined Key Distribution Centers \(KDC\)](#)

## Update deployment settings file to maintain Remote Desktop session

In case of network fluctuations, a system administrator is able to manage the continuity of the organization's Remote Desktop Protocol (RDP) session by customizing the Automation Anywhere Enterprise Control Room deployment properties file.

To keep RDP sessions connected in case of network fluctuation for specific time period, customize the deployment.properties settings file that is stored in the <application path>/config folder.

## Procedure

1. Go to the config folder in the application path. For example, C:\Program Files (x86)\Automation Anywhere\Enterprise\Control Room\config\
2. Open the deployment.properties file in edit mode  
The default properties are shown as:

```
rdp.desktop.height=768
rdp.desktop.width=1366
rdp.port=3389
```

3. Add the following properties to customize your RDP sessions:

```
rdp.status.timeout.interval=30
rdp.acquire.total.timeout.interval=120
wait.for.run.after.rdp.acquired=3
```

11.3.2

```

wait.seconds.to.close.rdp.after.device.disconnected=30
rdp.process.watcher.interval.seconds=30
rdp.close.on.bot.execution.complete=true

```

Note: The default values for status timeout, acquire total timeout interval, wait for run after rdp acquired are configured in the seconds time format. See [Remote Desktop Protocol session settings description](#) for more information on each setting.

- [Remote Desktop Protocol session settings description](#)

Use this as a reference to customize the deployment.properties settings file that is used to maintain the Remote Desktop Protocol (RDP) session during bot deployment.

Related reference

[Remote Desktop Protocol session settings description](#)

## Remote Desktop Protocol session settings description

Use this as a reference to customize the deployment.properties settings file that is used to maintain the Remote Desktop Protocol (RDP) session during bot deployment.

The table below describes each property for customizing your RDP sessions:

Property	Default value	Description
rdp.desktop.height	786	Desktop height of the remote desktop (screen resolution)
rdp.desktop.width	1366	Desktop width of the remote desktop (screen resolution)
rdp.port	3389	Remote Desktop Protocol (RDP) port. Update this if a different port is used.
rdp.status.timeout.interval	30	The communication response time between Enterprise Control Room and Enterprise client to verify the machine status for which RDP session is to be launched.
rdp.acquire.total.timeout.interval	120	The maximum time for which the server waits to begin the bot runner session.

Property	Default value	Description
wait.for.run.after.rdp.acquired	3	The maximum time for which the server waits to begin the session 0 (zero) before the user profile is invoked after which the actual user session begins.

#### Related tasks

[Update deployment settings file to maintain Remote Desktop session](#)

## Guidelines for General Data Protection Regulation

The General Data Protection Regulation (GDPR) is one of the strictest compliance frameworks with respect to maintaining privacy of personal data. The GDPR defines personal data as any data that can be used to identify a natural person.

That natural person is defined as the Data Subject. Business entities that define and determine the purpose and means of the processing of personal data (business process) are defined as Data Controllers. Business entities that perform the processing of personal data are defined as Data Processors. Data controllers and processors must be ready to demonstrate that their data processing activities and security processes adhere to the GDPR if the personal data they process refers to any Data Subject that is a citizen of any European Union (EU) member country or territory, even when that processing is performed outside of the EU. The purpose of the GDPR is to make sure that the rights of Data Subjects with respect to their personal information are maintained. These rights are concerned with privacy, processing for legitimate business purposes only, the right to control, access, and remove their personal information from the Data Processors systems.

Automation Anywhere customers, which utilize Automation Anywhere Enterprise (AAE) are typically Data Controllers and/or Data Processors in the context of GDPR. As software that is purchased, deployed and managed by the customer, compliance with GDPR depends upon the policies and procedures of the deploying customer entity. GDPR compels the deploying entity to implement appropriate technical and organizational measures to assure data is processed for stated purposes and that data is protected by design and by default. The guidelines described below must be followed to assure that Automation Anywhere is being utilized in a way that is compliant with the GDPR.

## Data Protection

Automation anywhere has a full set of security features that either automatically provide or are configurable by design to provide data protection. As with any enterprise application the consistent and proper utilization of security controls depends upon the organization. Several aspects of security within a customer environment are outside the scope of Automation Anywhere, for example the security posture of the operating system upon which Automation Anywhere is deployed, or the network security of the environment.

Automation Anywhere utilizes encryption technologies for data at rest, data in motion, and data in memory. Encryption technologies are documented in the Automation Anywhere Security Architecture Guides (for versions 10 and 11).

All users accessing Automation Anywhere may be authenticated utilizing standard centralized authentication methods such as Active Directory. Additionally credential access by Automation Anywhere may be done either with the built-in bank grade secure Credential Vault or with external credential storage systems such as CyberArk.

Authorization of Automation Anywhere users is outside the scope of Automation Anywhere software, the deploying entity must assure that only authorized personnel with a business need can access AAE. Corporate users with access to Automation Anywhere can be granted fine grained permissions via roles within the product supporting role based access controls (RBAC). The permissions and roles support sophisticated RBAC models assuring dual-controls and separation of duties within the operations of Automation Anywhere. Permissions can be implemented on all aspects of Automation Anywhere operation including: credentials, bots, bot runners, bot creators, bot schedules, audit log access, workload management queues, and pools. Because Automation Anywhere allows for the automation of any type of business process, it is the responsibility of the deploying entity to assure that only those personnel that are permitted to access applications involved with any automation are authorized to do so. Within this guideline, Automation Anywhere provides all permissions necessary to separate different bots, bot runners, and operating personnel along any line of business or processing, assuring separate processing domains within the product.

All user actions are audited within Automation Anywhere providing records of all access and actions taken by operations personnel. Automation Anywhere audit logging supports all major compliance frameworks.

Automation Anywhere supports a redundant and load balanced architecture that scales with business needs assuring availability of processing resources. Automation Anywhere support state synchronization across geographically distinct deployments supporting disaster recovery and resiliency in processing.

Bots are software programs developed by customer business experts, and as with any enterprise application development, state of the art requires Secure Software Development Life Cycle (SDLC) processes be implemented. Automation Anywhere supports separation of Development, Testing, and Production environments through a combination of separate deployments and RBAC as described above. See Security Architecture documents for more details (for versions 10 and 11).

## Pseudonymization

GDPR specifically calls out pseudonymization as an appropriate technical measure to protect data. An in-depth discussion of pseudonymization is outside the scope of AAE. Pseudonymization transforms data to artificial identifiers. This gives the Controller and Processor a way to process data such that it is no longer possible to use the data to identify a natural person. Tokenization is another approach that transforms data such that it can be referenced later but in terms of the tokenized data such that it cannot be used to identify a natural person. Automation Anywhere recommends adherence with GDPR Article 25 in the use of pseudonymization and tokenization, in all cases where personal information is being processed by bot. The use of pseudonymization for personal data removes any risk involved with data remanence within the Automation Anywhere platform.

## Data Remanence In Enterprise Control Room

There are instances where data is retained within the databases which support the Automation Anywhere Enterprise Control Room. Specifically when using Workload Management, Bot Insight, and IQ Bot. In all cases regarding data remanence in Enterprise Control Room, pseudonymization and tokenization reduce Controller and Processor entity effort to comply with GDPR. Also, when enabling logs for debugging information such as username (users of the platform) will be retained in the logs.

## Workload Management and Queues

When utilizing workload management to deploy multiple bots to the same automation, the work items that are placed into the queues are stored in the database. Through the Enterprise Control Room UI any work item may be queried, reviewed, and deleted. When processing personal data in work items, queues should be periodically deleted.

## Bot Insight

When using Bot Insight, any field that is tagged for analytics inside the automation task built in the AAE developer tool will be logged and stored in the Analytics database. In version 11 Bot Insight, all variables are automatically tagged for capturing data and therefore would be stored in the database. For version 11 Bot Insight, this default action of tagging all data variables should be unchecked for fields that contain personal data.

## IQ Bot

IQ Bot stores images uploaded by users or RPA tasks and extracts structured data from those images. These images and the extracted data are temporarily stored in the database while IQ Bot is running or when it is halted with an exception. After all exceptions in an IQ Bot run are either validated or invalidated, the data is removed from the database. Training images for IQ Bot are stored in the database and should not contain personal data that can identify a natural person. For IQ Bot version 5.2.1 or earlier the system will automatically move production images to the training environment. The training environment should be reviewed periodically to identify production images and remove them. In version 5.3, scheduled for release in June 2018, there will be a feature to disable this automatic movement of production images to the training environment.

## User Credentials

User credentials in Automation Anywhere versions 10 and 11 can be added and deleted by any administrator with the appropriate privileges, set by a role. The Enterprise Control Room supports the querying, reviewing, and deleting of any credential at any time.

## Automation Anywhere Databases and Data Removal

If processing has been done and pseudonymization has not been applied, it may be necessary to remove data from Automation Anywhere databases. Automation Anywhere uses a standard SQL database either co-resident on the Enterprise Control Room server or a corporate database server or cluster identified during installation and configuration of the Enterprise Control Room. Consult your database admins to find, report, extract data from the Automation Anywhere database. A bot is available from the Automation Anywhere Bot Store that can be used and adapted for this purpose.

# Using Enterprise client

---

Enterprise client is optimized for the business user and includes advanced capabilities for developers and administrators.

Enterprise client has the shortest learning curve and is consistently recognized as the easiest to use, most intuitive interface in the industry – for the bot developer, the automation administrator and the business user.

- [Connect to Automation Anywhere Enterprise Control Room](#)

How to connect and login to the Enterprise Control Room using either the Enterprise client login window or the command prompt.

- [Customizing the Enterprise client](#)

Customize the Enterprise client.

- [Working with tasks](#)

Create, record, run, and edit automated processes or tasks.

- [Create an automated task](#)

Automation Anywhere provides several ways to create automation tasks.

- [Stopping a task manually](#)

While running an automated task, you can pause or stop the process manually from the progress window.

- [Tour of the Workbench](#)

The Workbench provides all the tools required for building, customizing, and enhancing automated processes using drag-and-drop operations.

- [Create a bot](#)

Learn about all the tools necessary for enhancing, streamlining, and deploying automated processes.

- [Scheduling Tasks to Run](#)

After creating an automated task, you can schedule the tasks to run based on a schedule or on a trigger event.

- [Enabling Version Control in Automation Anywhere](#)

Automation Anywhere has an integrated feature on Version Controlthat allows users to manage various versions of files and enforce controlled edits.

- [Viewing System Logs](#)

Automation Anywhere logs all events that occur in the application. Major events, such as a task run, task creation, and changes to task properties are logged.

- [Debugging TaskBot](#)

Automation Anywhere enables users to debug TaskBot Logic.

- [Communicating with the Server](#)

- [Enabling Remote Desktop Connections](#)

This topic provides information about using Remote Desktop applications to run your automated processes.

- [Commands](#)

The following Enterprise clientcommands are available for use.

- [Using Variables](#)

Variables are used in conjunction with certain commands to build automated tasks. This is the landing page for information about variables in Automation Anywhere.

- [Using special features](#)

Refer to each feature below for more detail.

- [Bot Store integration overview](#)

The seamless integration of the Bot Store enables you to access the Bot Store directly from the

Enterprise client. In the Enterprise client, you can download bots and Digital Workers from the Bot Store or create and package Digital Workers and bots to be uploaded to the Bot Store.

- [MetaBot Overview](#)

MetaBots are highly reusable, create it once, and use it everywhere bots. MetaBots can be shared across an enterprise or uploaded to the Bot Store to make it available to the entire Automation Anywhere community.

- [Understand the MetaBot Designer](#)

Well designed MetaBots are key to efficient and reliable reuse of all the Master Bot components and functionality.

- [Work with MetaBot Designer using the Enterprise client](#)

The MetaBot Designer is included with the Enterprise client. An Automation Anywhere administrator configures that appropriate licenses and packaging to enable the Master Bot Designer.

- [Additional features and functions in MetaBot Designer](#)

The MetaBot Designer provides bot developers several unique features and functions for creating MetaBots.

- [Actions in the Workbench](#)

Select various Actions in the Workbench based upon the object and control type selected. Actions are allowed on HTML, .NET and Java Swing/AWT controls.

- [Upload considerations for MetaBots](#)

- [Metabot Variables](#)

Refer to each variable below for more information.

- [Metabot in Enterprise Control Room](#)

Refer to each section below for more information.

- [Metabot in Enterprise client](#)

Refer to each section below for more information.

- [Resolving technical issues](#)

Automation Anywhere is committed to outstanding customer care. As a valued customer, your time is important and we would like to help resolve your issues as soon as possible.

- [Troubleshoot Enterprise client](#)

Use the links listed in this topic to troubleshoot issues in Enterprise client.

#### Related concepts

[Working with Tasks](#)

#### Related reference

[Enterprise client overview](#)

[Customizing the Enterprise client](#)

[Automation Anywhere Enterprise architecture](#)

[Performance Architecture Overview](#)

## Connect to Automation Anywhere Enterprise Control Room

How to connect and login to the Enterprise Control Room using either the Enterprise client login window or the command prompt.

### Overview

Automation Anywhere allows users to monitor and administer a large multi-site, and complex automation infrastructure using the web-based Enterprise Control Room. Learn how to connect and log in to the Enterprise Control Room using either the Enterprise client login window or the command prompt.

## Authentication

There are three forms of client authentication for accessing the Enterprise Control Room:

### Windows or Active Directory (AD)

If the Enterprise Control Room is configured for Windows AD authentication type, you select Windows authentication, and you do not need to provide any credentials. You are authenticated with your AD or Windows credentials. This option is selected by default.

**Tip:** If for any reason automatic Windows authentication fails, choose the User Credentials option to continue.

### Single Sign-On (SSO)

SSO is available when the Enterprise Control Room is configured for SSO SAML 2.0 authentication type. When you select this option, you do not enter credentials directly on the Client Login screen. Instead, when you click Login, you are redirected to your organization's IdP authentication page where you must log in using your SSO credentials.

**Note:**

- A registry entry (32 bit) is made under

```
HKEY_CURRENT_USER\Software\Microsoft\InternetExplorer>Main\FeatureControl
          \FEATURE_BROWSER_EMULATION
```

since Enterprise client makes use of the same rendering engine used by Internet Explorer to display the SSO authentication page.

- You might experience some issues with the login display if the authentication page has trouble while rendering in Internet Explorer. If IdP login page does not render properly, add the IdP Login URL in the trusted sites for Internet Explorer browser.

### User Credentials

This method is available when the Enterprise Control Room is configured for Database authentication type. When you select this option, you enter the user credentials that were created by the Enterprise Control Room administrator. Contact your Enterprise Control Room administrator in case you forget your password.

- [Connect from Client](#)

Connecting to the Automation Anywhere Enterprise Control Room from the Enterprise client.

## Connect from Client

Connecting to the Automation Anywhere Enterprise Control Room from the Enterprise client.

The authenticated username and status will be displayed in the status bar after successful login.

## Procedure

1. Supply the Enterprise Control Room access URL.

From the Client Login, supply the Enterprise Control Room service URL in the field provided. A single Enterprise client may connect to more than one Enterprise Control Room.

- 11.3.2** If an Access Manager Reverse Proxy such as the IBM WebSEAL is configured between the Automation Anywhere Enterprise client and Enterprise Control Room, supply the Reverse Proxy server URL instead of the Enterprise Control Room access URL.
2. Provide authentication details.  
Select Windows, Single Sign-On or User Credentials.  
Note: To login to the Enterprise Control Room using a different user credentials, click Tools Re-login from the Start menu.

## Customizing the Enterprise client

Customize the Enterprise client.

After installing the Enterprise client, customize it by clicking on Tools Options.

You can customize the following options for your client:

- [Auto Login](#) - to automatically unlock and logon to a computer while running an automated task.
  - [Email Settings](#) - email notification task status after it has been executed.
  - [Client Hotkeys](#) - to eliminate keystroke and mouse movement errors.
  - [View Options](#) - to customize the run-time view of an automated task.
  - [Using Advanced Settings](#) - to set various options for recording tasks, defining the application locations, editing tasks and enabling system logging.
  - [Using Run-time Settings](#) - to customize how your automated process runs and performs, and ensure that the process runs as expected.
  - [Using ROI Settings](#) - to calculate the return on investment (ROI) in US dollars.
  - [Using Plugin Settings](#) - to install/uninstall plugins for IE 11, Flex, Silverlight, and Java.
  - [Configuring Web Recorder Settings](#) - to record web-only tasks.
- 
- [Auto Login](#)  
Use the Auto Login option to run tasks on machines that are unattended.
  - [Email Settings](#)  
Enables email notifications of bot status.
  - [Client Hotkeys](#)  
Define Hotkeys to save time and eliminate keystroke and mouse errors.
  - [View Options](#)  
Viewing options control the way content is displayed.
  - [Using Advanced Settings](#)  
The Advanced settings option enables you to customize mouse controls, keystrokes, screen captures, system and debug logs when you record a bot, and configure the proxy server settings for the web services commands. These settings are updated from Tools > Options.
  - [Using Run-time Settings](#)  
Run-time settings control how the automated task runs and helps to ensure that the task runs as expected.
  - [Using ROI Settings](#)  
Automation Anywhere calculates the return on investment (ROI) that results from automating processes. It is a cumulative savings amount, measured in U.S. dollars, that is calculated as bots are run.
  - [Java Settings](#)  
A Java Plugin is required to enable automation of Java applications.
  - [Using Plugin Settings](#)  
Install, uninstall, and fix plug-ins that enable access to UI objects in specific applications.

- [Configuring Web Recorder Settings](#)

To automate web enabled tasks, configure the Web Recorder settings from Tools Options Web Recorder Settings.

- [Setting User Access Control and Data Execution Prevention](#)

In some cases, UAC and DEP settings may need to be modified.

## Auto Login

Use the Auto Login option to run tasks on machines that are unattended.

The Auto Login functionality enables a bot to automatically log on to a machine, run a scheduled automation task, and restore the machine to its original locked or logged off state after completing the task. Running the automated tasks on unattended machines helps you achieve optimum utilization of the Bot Runner and less idle time.

Use the Auto Login option to:

- Schedule a task
- Run reports
- Run workflows
- Trigger an automation task

Auto Login restores a machine to its original state in the following scenarios:

- When a task is stopped or paused either from the Enterprise client or Enterprise Control Room. This ensure that the security of the machine is not compromised when the task is paused or stopped.  
Note: When the task resumes, it continues to run in the background on the locked machine.
- When a task encounters an error during execution.

## Bypassing Legal Disclaimer

Some system operating systems display a legal or privacy notice, that requires a user response every time the users login. If your bot runs on one of these systems, ensure the option, Bypass Legal Disclaimer, is selected when you setup the Auto Login option for the bot. See, [Setting Up Auto Login](#) for more information.

- [Auto Login compatibility](#)

Bots can Auto Login to the listed operating systems and environments.

- [Setting Up Auto Login](#)

Auto Login setup to run automated tasks on machines that are unattended.

Related tasks

[Setting Up Auto Login](#)

Related reference

[Auto Login compatibility](#)

## Auto Login compatibility

Bots can Auto Login to the listed operating systems and environments.

Use the Auto Login option to enable a bot to log into supported operating systems and environments. The listed operating systems are all supported in English. Additional language support is listed for specific Windows versions.

Windows 7

32 bit  
64 bit

**11.3.3** Citrix (Xen Desktop)

**11.3.3** Horizon VDI

Windows 8

32 bit  
64 bit

**11.3.3** Windows 8.1

64 bit

Windows 10

64 bit

Japanese

**11.3.3** Citrix (Xen Desktop)

Horizon VDI

Windows Server 2008 R2

64 bit

Windows Server 2012

64 bit

Japanese

**11.3.3** German

**11.3.3** French

**11.3.3** Windows Server 2012 R2

Citrix (Xen Desktop)

Windows Server 2016

64 bit

**11.3.3** Spanish

Terminal

**11.3.3** Citrix (Xen Desktop)

Specific actions, in combination can vary depending on the operating system and environment. Not all combinations have been tested. When logged in through Auto Login, bots can complete its tasks, with the following conditions:

Run bot schedule locally

The bot performs its tasks.

The bot runs its tasks when the machine is in the listed state.

Lock system

The bot runs on a virtual machine or physical machine that has a locked screen.

The bot unlocks the machine and after execution it locks the screen again.

Log off system

The bot is deployed on a virtual machine or physical machine that requires a login.

The bot logs on the machine and after execution it logs off from the machine.

**Acknowledge legal disclaimer**

If the system prompts for a legal disclaimer verification, and:

- The bot has the option Bypass Legal Disclaimer selected, the bot accepts the legal disclaimer and proceeds with its tasks.
- The bot does not have the option Bypass Legal Disclaimer selected, the bot fails.

If the system does not prompt for a legal disclaimer verification, and:

- The bot has the option Bypass Legal Disclaimer selected, the bot fails.
- The bot does not have the option Bypass Legal Disclaimer selected, the bot proceeds with its tasks.

**Deploy bot**

The bot can be deployed from the Enterprise Control Room on the machine.

The bot can deploy apps on the machine, as part of a task.

**Remote Desktop (RDP) to another system**

The bot can use RDP to login to the machine and execute its tasks.

**Disconnect from RDP system**

If the Enterprise Control Room is connected to the remote machine, then the bot can Auto Login to the machine, execute its tasks, and disconnect from the machine.

If the Enterprise Control Room is not connected to the remote machine, then the bot cannot auto login to the remote machine, and the bot fails.

**Log into a Virtual Machine (VM)**

The bot can login to a VM.

The bot can run from a VM

For Automation Anywhere versions prior to Version 11.3.3:

- Auto login cannot run bots in LOGOFF mode from cloud VMs (Azure, Amazon, Verizon etc).
- Auto login cannot run bots in LOGOFF & Disconnect mode from a Citrix system or Terminal server (multi-user session systems).
- Auto login cannot run the Legal Disclaimer from bots when the Remote Desktop Check Option is selected in the Enterprise Control Room.
- Auto Login runs LOGOFF on Windows Server 2016 from Remote Desktop inconsistently. Instead, use the bot scheduling option, Run Bot Runner session on Control Room.

**Related concepts**

[Auto Login](#)

**Related tasks**

[Setting Up Auto Login](#)

**Setting Up Auto Login**

Auto Login setup to run automated tasks on machines that are unattended.

Perform the following steps to setup Auto Login:

**Procedure**

1. From the Enterprise client, select from the top menu bar Tools > Options > Login Settings.

2. Click the Auto Login your computer when the task runs checkbox to have your bots use the Auto Login features with all of your automated tasks.
3. Enter Windows Login Credentials for the user who Auto Logged in:

Specify a user that has authorization to run the tasks in the bot on the computer.

Username: Enter the fully qualified name of the user in this field. For example, US-AA/john.smith.

Password: Enter the password for the user you have specified.

4. Optionally, click the Bypass legal disclaimer checkbox to automatically accept possible legal disclaimers when the bot logs in to a machine.
5. Click OK.

Related concepts

[Auto Login](#)

Related reference

[Auto Login compatibility](#)

## Email Settings

Enables email notifications of bot status.

To enable email notifications, configure email settings first.

### Procedure

1. Click on Tools then click Options.  
Note: You can also configure email notification settings by selecting Properties > Notification.
2. Click Email Settings  
Now supply the following Outgoing Mail Server (SMTP) information:

Host

Obtain this information from your Internet email provider, or from the configuration section of your email program.

Port

The default port is 25.

Username

If the outgoing mail server requires a user name and password, specify the user name in this field.

Password

If the outgoing mail server requires a user name and password, specify the password in this field.

3. Click Email Notification to set notification content.

Enter a "From" and "To" email address as well as one or more email addresses to be notified. Also include a subject line and main body content for the email.

Tip: Always try to include the TaskBot/ MetaBot Logic name with the variable <taskname> / <logicname>.

Related reference

[Sending email notifications](#)

[Properties](#)

## Client Hotkeys

Define Hotkeys to save time and eliminate keystroke and mouse errors.

Define hotkeys for the following operations:

- Start recording
- Stop recording
- Stop a running task

These actions have hotkeys defined by default. To select different keys on the keyboard for these actions, simply press the Hotkey... button and select a key combination from the list.

To reset the action to the default, press the Default button.

Note: To use hotkeys, ensure that Automation Anywhere is running in the Windows system tray.

- [Configuring a New Hotkey](#)

Configure a new hotkey.

### Configuring a New Hotkey

Configure a new hotkey.

Follow these steps to configure a new hotkey.

### Procedure

1. From the main Automation Anywhere window, click on Tools then select Options
2. In the Options window, click on Hotkeys
3. Set the Hotkeys for Start recording, Stop recording and Stop task by clicking the Hotkey button.  
Note: Modify a hotkey by pressing the Hotkey button. Also set the selected key as default.
4. Optional: Select Properties tab and select Hotkey.  
Alternately, to set hotkeys for the selected task, select an action and a key combination from the list, and press OK.

## View Options

Viewing options control the way content is displayed.

Access the viewing options at Tools Options View. Customize the the run-time window display as follows:

#### Show Run Time Window

Show or hide the Run Status displays while a task runs.

#### Show Errors

Show or hide any errors or issues while running a task.

#### Show Start Page

Show or hide the Automation Anywhere Start Page at startup.

---

Note: Make sure to save any changes.

## Using Advanced Settings

The Advanced settings option enables you to customize mouse controls, keystrokes, screen captures, system and debug logs when you record a bot, and configure the proxy server settings for the web services commands. These settings are updated from Tools > Options.

### Advanced settings for recording

#### Record Mouse Moves

Select this option to record the mouse moves that have application-specific meaning. For example, application menus.

#### Record Mouse Clicks

Select this option to record the mouse clicks.

#### Record Keystrokes

Select this option to record keystrokes.

#### Capture Screen-shots While Recording

Select this option to capture and display images of the screenshot when you record bots.

### Advanced settings for application location

#### Application Path

Use this option to specify a different application path.

The default application path is the Automation Anywhere Files folder under My Documents. The application path can be set to a local drive or to a network path. The network path could be a mapped drive as well.

To set up an application path, ensure that:

- It is unique and not shared between users.
- It is accessible at all times.
- Users have read and write privileges for the application path.

When changing this location, all the tasks are saved in the new location. The new path takes effect when you restart the Enterprise client.

Note:

- After changing the application path, all the triggers, hotkeys, and scheduled bots run as normal.
- However, if the domain name changes, manually update the application path.
- If a network drive is specified, the speed of the bots is determined based on the network speed.

### Advanced settings for editing and logging

#### Edit Task on double-click in Task List

Enable this option to change the default setting. By default, a double-click on a TaskBot runs or executes the TaskBot.

#### Enable System Logging

System logs show all the client activities.

## Enable Debug Logging

To debug errors that appear in Automation Anywhere and related services, choose to enable the logs during task execution (the status bar of the application indicates debug logging is enabled).

- When debug logging is enabled, all Debug, Info, Warning, Error and Fatal logs are saved.
- When debug logging is disabled, only Error and Fatal logs along with a maximum of 256 lines of buffered data of the recently raised Warning and Info logs are saved.

Note: By default, the system stores a maximum of ten log files of 1 MB each. The system overwrites the existing log entries when this limit is reached.

If there are different log configuration files for the applications and services, then the Enable Debug Logging check box is set to an Indeterminate state and the system displays a Debug logging enabled message on the status bar.

The following table shows the different states of the Enable Debug Logging check box when you enable and disable the debug logging.

Services	Applications	State	Description
Debug logging is enabled	Debug logging is enabled	<input checked="" type="checkbox"/> <b>Enable Debug Logging</b>	The check box is set to selected when Debug logging is enabled.
Debug logging is disabled	Debug logging is enabled	<input type="checkbox"/> <b>Enable Debug Logging</b>	The check box is set to indeterminate when debug logging is different for applications and services, or if another user edits the log configuration file.
Debug logging is enabled	Debug logging is disabled	<input type="checkbox"/> <b>Enable Debug Logging</b>	The check box is set to indeterminate when debug logging is different for applications and services, or if another user edits the log configuration file.
Debug logging is disabled	Debug logging is disabled	<input type="checkbox"/> <b>Enable Debug Logging</b>	The check box is cleared when debug logging is not enabled for both applications and services.

Note: If the debug log file is accidentally deleted, the system creates a new file using the default settings when the Client applications are started or when you make any updates on the Options screen.

If the debug log file is corrupt, the system takes a backup of the existing file with the filename <originalFileName>\_Date\_Time\_backup.xml and replaces it with the default log file when any application starts or if Options is accessed.

## Clear Logs

Use this to delete all the application logs. Clearing the logs do not delete the service logs that are common for all users. To delete the service logs, delete them manually from the public documents \Enterprise client Files\LogFiles folder.

Note: The logs for applications that are running are not cleared. To clear the application logs, close all the running applications and manually delete all the files in Application Path\LogFiles folder.

## Export Logs

To export logs to this folder:

1. Create a new folder or select an existing folder.
2. Click Select Folder.

This automatically creates two sub-folders - Application Logs and Service Logs where the exported logs are saved.

## Advanced settings for proxy server

### Proxy Server Settings (For Web Service)

These are applicable for REST and SOAP web service commands. If the environment uses a proxy server, specify a Host Name or IP Address, and a Port Number that is active and within the 0 through 65535 range.

Attention: **11.3.3** The restriction on using a Port number from 1023 and above is removed from Version 11.3.3.

- [Debug Log for Autologon](#)

Enable debug logging for autologon.

### Debug Log for Autologon

Enable debug logging for autologon.

Enable debug logging.

## Procedure

1. Browse to C:\Users\Public\Documents\Automation Autologin/<yourusername>
2. Edit the Automation.Autologin.Settings.XML file.
3. Include <log><debug>true</debug></log> within the <AutoLogin> XML element and save the XML file.
4. Create a folder with the name LogFiles in C:\Users\Public\Documents\Automation Autologin.

```

1  <?xml version="1.0" encoding="UTF-8"?>
2  <configuration>
3    <AutoLogin>
4      <machinestatus>
5        <beforelaststatus>SessionLock</beforelaststatus>
6        <laststatus>SessionUnlock</laststatus>
7        <currentstatus>SessionUnlock</currentstatus>
8      </machinestatus>
9      <legalnotice>
10        <bypass>false</bypass>
11      </legalnotice>
12      <log>
13        <debug>true</debug>
14      </log>
15    </AutoLogin>
16  </configuration>

```

## Using Run-time Settings

Run-time settings control how the automated task runs and helps to ensure that the task runs as expected.

### Run Task as an Administrator

Requires the user name and password of the computer administrator for a task to be run.

### "Start In" Path of Task

While the task runs, a new folder is created as specified in this setting field. All newly created files and folders are located in this path location. Use this setting when a specific path is not specified in the Log-To-File command, or other commands, where a file or folder path is required.

### Capture Screen-shots while Running a Task

Enable this setting to capture visual logs (screen-shots) as a task runs.

Tip: Turning this feature off can enhance performance and free up hard drive memory.

## Using ROI Settings

Automation Anywhere calculates the return on investment (ROI) that results from automating processes. It is a cumulative savings amount, measured in U.S. dollars, that is calculated as bots are run.

### Enable or disable ROI logs

The ROI calculation is based on the cost of hourly time, run time, debug time, alert assistance time, documentation time, training time, and knowledge capture.

**11.3.3**

You can choose to capture the ROI parameters into a log file, by selecting either Enable or Disable option for ROI Logging from Tools > Options > ROI Settings. To Generate Logs for ROI from Tools > System Logs for a specific date range, use the App Configuration Log Type.

Tip: Disable the option if you notice performance degradation on your Bot Runner machines.

Note that any change to the ROI value are reflected in future ROI calculations.

Related reference

[Viewing System Logs](#)

Related information

[Using the ROI Calculator](#)

## Java Settings

A Java Plugin is required to enable automation of Java applications.

### Applying Java Settings

Launch Automation Anywhere in administrator mode in order to be able to configure the JRE settings. Configure the Java settings, by clicking on Tools Options Java Settings.

Note: Close any Java applications.

1. Select the appropriate JRE file from the location by clicking the browse button.
2. Select 32 or 64 bit configuration and click OK.  
Tip: Configure both 32 and 64 bit JRE settings if both used for recording web-based tasks. Then toggle between 32 and 64 for recording using this option.
3. The Options window is displayed, click Apply.
4. Confirm to copy the listed files to selected JRE folder. The settings are added to the Java Runtime Environment List.
5. Click OK.

Tip: To delete the settings from the list, click the delete icon. Administrator mode is required to make deletions.

To automate multiple Java applications, operating on different JREs, make sure to add all JREs to the Java Settings.

Note:

- While recording a Java application, select the correct JRE from the list and click Apply.
- It is recommended that installation of the Java plugin from Plugin Settings and use the Java settings option only to add the plugin to a specific JRE.

Related tasks

[Java Configuration](#)

Related reference

[Using Plugin Settings](#)

[Install plug-ins using the command line](#)

# Using Plugin Settings

Install, uninstall, and fix plug-ins that enable access to UI objects in specific applications.

## Overview

Plug-ins are utilized in order to record and run:

- Web based tasks in Internet Explorer 11, Google Chrome, Microsoft Edge, and Mozilla Firefox.
- Applications that use Adobe Flex, Microsoft Silverlight, and/or Oracle Java technologies.

Note: From Version 10.2 onwards, the desktop (standalone) Java applications (running on JRE 6 or later versions) can be automated without installing the Java Plug-in.

Use this collection of topics to manage Enterprise client plug-ins.

- [Install plug-ins](#)

Install plug-ins on Enterprise client to access UI objects in certain applications.

- [Install plug-ins using the command line](#)

Use the command line to install Adobe Flex, Google Chrome, Microsoft Silverlight, Mozilla Firefox, and Oracle Java plug-ins.

- [Install plug-ins in offline mode](#)

If you do not have internet access, install Adobe Flex, Microsoft Silverlight, and Google Chrome plug-ins in the Enterprise client using the command window.

- [Java Configuration](#)

Working with configuration options for Java.

- [Uninstall Plug-ins](#)

- [Modify Google Chrome plug-in for A2019](#)

Information about modifying the Google Chrome plug-in when you are using Automation Anywhere Enterprise Version 11.3.3 and Automation Anywhere Community edition simultaneously.

Related tasks

[Install plug-ins](#)

[Install plug-ins in offline mode](#)

[Java Configuration](#)

Related reference

[Install plug-ins using the command line](#)

[Uninstall Plug-ins](#)

## Install plug-ins

Install plug-ins on Enterprise client to access UI objects in certain applications.

## Procedure

1. Go to Tools > Options > plug-in Settings.
2. Click Install for the required plug-in.  
Repeat for additional plug-in installations.
3. Click OK.

Note: For Windows Server 2012:

- The IE Advanced Security must be turned off.

- The Enable Enhanced Protected Mode\* check box in IE must be cleared (Go to IE Settings > Internet Options > Advanced tab > Security).

#### Related tasks

[Java Configuration](#)

#### Related reference

[Uninstall Plug-ins](#)

[Install plug-ins using the command line](#)

## Install plug-ins using the command line

Use the command line to install Adobe Flex, Google Chrome, Microsoft Silverlight, Mozilla Firefox, and Oracle Java plug-ins.

To install the plug-ins:

1. Click Start, and enter cmd in the Search box.

Command Prompt appears.

2. Click Run as administrator.
3. Navigate to the Enterprise client installation path.

For example, C:\Program Files (x86)\Automation Anywhere Enterprise 10.6\Client.

The following parameters are supported:

```
/install
    Install the plug-in.
/uninstall
    Uninstall the plug-in.
/reinstall
    Reinstall the plug-in.
/silent
    Silently install, uninstall, or reinstall the plug-in.
/jrePath
    Path of Java Runtime Environment in which to install the plug-in.
```

To install the plug-ins sequentially, type the following text in the command line prompt:

Adobe Flex

```
AAplug-inInstallation.exe /Flex
```

Note: Flex is not supported on Microsoft Windows 10, Microsoft Windows Server 2012, or Microsoft Windows Server 2016.

Important: Close all Flex applications before installing the plug-in and ensure (by running the same in Run window) that the %homedrive%homepath% location points to a local drive.

If %homedrive%homepath% is on the network:

1. Copy mm.cfg as well as the Automation Anywhere installation folder from %homedrive%homepath% to the local drive.

For example, C:\Program Files (x86)\Automation Anywhere Enterprise 11.0\Client.

2. Change the file location in the mm.cfg, so that it points to the AAMainLoader.swf file (the one of local drive).
3. Copy the updated mm.cfg file and folder back to %homedrive%%homepath%.
4. Open AAE Client and navigate to Tools > Options > plug-in Settings and verify.

Google Chrome

```
APlug-inInstallation.exe /Chrome
```

Microsoft Silverlight

```
APlug-inInstallation.exe /Silverlight
```

Mozilla Firefox

```
APlug-inInstallation.exe /Firefox
```

Internet Explorer (IE)

Note: Installing IE through command prompt is not supported.

Oracle Java

```
APlug-inInstallation.exe /Java
```

Edge

Available only for machines that run on Microsoft Windows 10.

1. In the application installation path, enter the following parameter:

```
C:\Program Files (x86) \Automation Anywhere\Enterprise\Client> APlug-in  
Installation.exe /edge /install /silent
```

Note: The silent parameter installs the plug-in in silent mode, which restricts the system from displaying any messages.

Note: You can also reinstall the plug-in using the command line. Use Reinstall parameter instead of Install.

Related tasks

[Install plug-ins](#)

[Java Configuration](#)

Related reference

[Uninstall Plug-ins](#)

## Install plug-ins in offline mode

**11.3.1.4** If you do not have internet access, install Adobe Flex, Microsoft Silverlight, and Google Chrome plug-ins in the Enterprise client using the command window.

## Procedure

1. Download the following plug-in setup file(s), preferably to your local disk or shared file location:
  - a) Adobe Flex:  
Click [this link](#) to download the setup file.  
Tip: The Adobe Flex debugger file that is compatible with your 32 or 64 bit Operating System (OS) is downloaded automatically.
  - b) Microsoft Silverlight:

Click [this link](#) to download the setup file compatible with a 32 bit OS.

Click [this link](#) to download the setup file compatible with a 64 bit OS.

c) Google Chrome:

Does not require a download. Go to step 2.

2. Open the command window in the Run as administrator mode.
3. Do the following to install the plug-in(s):

Option	Action
Adobe Flex	Enter <client installation folder>\AAPlug-inInstallation.exe / copyflexfiles in the command line.
Microsoft Silverlight	Enter <client installation folder>\AAPlug-inInstallation.exe / copysilverlightfiles in the command line.
Google Chrome	Enter <client installation folder>\AAPlug-inInstallation.exe / chrome /install in the command line.

4. Verify if the plug-in(s) are installed in the Automation Anywhere Enterprise client

#### Related reference

[Install plug-ins using the command line](#)

[Uninstall Plug-ins](#)

## Java Configuration

Working with configuration options for Java.

## Prerequisites

The Java plugin can be installed from Plugin Settings.

Note: Launch Automation Anywhere in the administrator mode in order to be able to install Java plugin and configure the JRE settings.

Tip: Use Java Settings only to configure for customized JRE.

Configure Java.

## Procedure

1. Exit and restart Enterprise client.  
Ensure that Enterprise client is open in the administrator mode (Right Click and select Run as Administrator.) The Enterprise client and Java applications should be opened in same mode.
2. Open Java desktop or web application.  
Note: For Java desktop app, use the command line to externally open the JAVA desktop application in 32 or 64 bit.
3. In Java Settings, browse to JRE from Program files Java  
Select 32 bit or 64 bit JRE.

Note: Make sure your Java app is using 32 bit JRE if tools has 32 bit Java settings. If Java app is using 64 bit JRE, tools should have 64 bit java.

#### 4. Click OK.

To automate multiple Java Applications (which use different versions of JREs).

## Next steps

### JAVA desktop app

Start Recording the Java Application. (Verify Java Accessibility from Client Command Editor).

### Play test

Will play if all settings are correct.

Note: Create EXE of Java test and run on fresh machine, Player will prompt unavailable JRE settings and ask to allow to add required files. Respond Yes to inject required files in Java\JRE\*\lib\EXT and Java\JRE\*\bin. Then the test will fail/stop. Now replay the EXE.

### Related tasks

[Install plug-ins](#)

### Related reference

[Install plug-ins using the command line](#)

[Create an automated task](#)

[Best practices for recording tasks](#)

## Uninstall Plug-ins

## Reinstalling/Uninstalling various plug-ins

Uninstall and reinstall is available as an option for IE 11, Edge and Java plug-ins only.

Note: Automation Anywhere Enterprise does not have the provision to uninstall Silverlight and Flex/Flash plug-ins.

To uninstall plug-ins, ensure you use the Run as administrator option to open the Enterprise client application.

### 11.3.3 Mozilla Firefox

Uninstall the Firefox plug-in from Firefox Extensions page.

### Internet Explorer 11

From the client, click the Uninstall link provided in the plug-in column.

### Silverlight

Uninstall the Microsoft Silverlight program from Control Panel Uninstall.

### Flex

Uninstall Adobe Flash Player xx NPAPI from Control Panel Uninstall.

### Chrome

Uninstall the Chrome plug-in from Chrome Extensions page.

Note: Automation Anywhere Enterprise does not have the provision to uninstall this plug-in from Tools Options plug-ins.

### Edge

- Use the Uninstall link provided in the plug-in column.
- Use the uninstall option from the extension in Edge browser

### Java

Use the Uninstall link provided in the plug-in column as well as the following steps:

1. Clear the Enable Java Access Bridge check box from Control Panel Ease of Access Ease of Access Centre Use the computer without a display.
2. Delete the two files - Automation.JavaAccessBridge64.dll and WindowsAccessBridge-32.dll from the Enterprise client installation location.

## Uninstall through CLI

1. Click Start, and enter cmd in the Search box.

Command Prompt appears.

2. Click Run as administrator.
3. Go to the application installation path, and enter the required parameter(s):

### 11.3.3 Mozilla Firefox

```
C:\Program Files (x86)\Automation Anywhere\Enterprise\Client>
AAplug-inInstallation.exe /Firefox /uninstall
```

Edge

```
C:\Program Files (x86)\Automation Anywhere\Enterprise\Client>
AAplug-inInstallation.exe /Edge /uninstall
```

Flex

```
C:\Program Files (x86)\Automation Anywhere\Enterprise\Client>
AAplug-inInstallation.exe /Flex /uninstall
```

Silverlight

```
C:\Program Files (x86)\Automation Anywhere\Enterprise\Client>
AAplug-inInstallation.exe /Silverlight /unins
tall
```

Java

```
C:\Program Files (x86)\Automation Anywhere\Enterprise\Client>
AAplug-inInstallation.exe /Java /uninstall
```

Related tasks

[Install plug-ins](#)

[Java Configuration](#)

Related reference

[Install plug-ins using the command line](#)

## Modify Google Chrome plug-in for A2019

Information about modifying the Google Chrome plug-in when you are using Automation Anywhere Enterprise Version 11.3.3 and Automation Anywhere Community edition simultaneously.

## Issue faced

When you upgrade to Automation Anywhere Enterprise Version 11.3.3 and are also using the Community edition simultaneously, you may not be able to record a task using the Record feature or Capture action.

## Reason

This issue arises because Automation Anywhere Enterprise Version 11.3.3 uses the Google Chrome plug-in version 12.0, which is not supported with the Community edition.

## Resolution

To resolve this issue, do the following:

- Rename the automation.chrome.agent registry key to automation.chrome.agent.old

The registry key is available at: Computer\HKEY\_CURRENT\_USER\Software\Google\Chrome\NativeMessagingHosts

- Disable the Google Chrome plug-in version 12.0.

## Configuring Web Recorder Settings

To automate web enabled tasks, configure the Web Recorder settings from Tools Options Web Recorder Settings.

- Recorder Settings

**Record on Mouse Down**

Select to record a task with the help of Web Recorder using mouse down event (i.e. while scrolling).

- Runtime Settings

**Internet Explorer Timeout**

Define the time (in seconds) for the Internet Explorer browser to wait before the required page uploads. The maximum time out allowed is 240 seconds.

**Parallel Threads to Find Broken Links**

Input the number of broken links that can be processed at a time. Default is set at 10.

**Find Broken Links Time Out**

Use this to allow the web recorder to wait for the 'Broken Link' to exist. Default is set at 10.

- General Settings

**Launch Internet Explorer as a Process**

Enable this option while recording in stringent security environments.

## Setting User Access Control and Data Execution Prevention

In some cases, UAC and DEP settings may need to be modified.

To ensure smooth operation on machines that run on OS Windows Vista and above, follow these steps:

- Check to see whether User Access Control (UAC) is turned on for the computer that is running Automation Anywhere::
- On the Windows desktop, select on Start Control Panel User Accounts Change User Account Control Settings.
- Set Never Notify.

- Add Automation Anywhere to the list of exceptions under Data Execution Protection (DEP).
- On the Windows desktop, select on Start Control Panel System Advanced System Settings.
- On the Advanced tab, click the Settings button.
- Click on the tab Data Execution Prevention and select the option Turn on DEP for all programs and services except those I select.
- Click on the Add button, and add the Automation Anywhere.exe (Program Files (x86)\Automation Anywhere) folder to the list.
- Click Apply and then click OK.
- Reboot the computer to ensure that the new settings take effect.

## Working with tasks

Create, record, run, and edit automated processes or tasks.

### Overview

From the Task page, perform the following functions:

#### New

Create tasks via different recording methods.

#### Record

Record keystrokes, mouse clicks, and mouse movements.

#### Run

Run the selected task.

#### Edit

Edit the selected task from the workbench.

#### Delete

Delete a task.

#### Upload

Upload a task to the server.

#### Action

Select an action for the selected task:

##### Run

Run the selected task (the automated process).

##### Edit

Edit the selected task using the workbench.

##### Check Out

Check out the selected task for modification after uploading to Version Control repository.

##### Undo CheckOut

Undo the last updates to the checked out file.

##### Upload Task

Upload the selected task to the Server Task Repository.

##### Version History

Compare different versions of the task.

##### 11.3.3 Create Zip

Create bot package for Bot Store in Zip format.

##### Copy Task

Create a copy of the selected task.

**Rename**

Rename the selected task.

**Locate on Disk**

Create a copy of a task as an .atmx file in the location: My Documents\Automation Anywhere \Automation Anywhere\My Tasks.

**Send To**

Send a copy of a task to: Desktop(Create Shortcut), Mail Recipient, Startup Folder or My Documents.

**Delete**

Delete the task.

- **Properties**

Increase performance, efficiency, and usability of a task.

- **Schedule**

Schedule automated tasks to run.

- **Trigger**

Triggers enable a task to run automatically in response to an event that occurs on the computer, such as a new window opening or a specific file created.

**Related concepts**

[Stopping a Task](#)

**Related tasks**

[Send a task](#)

[Locating a Task](#)

**Related reference**

[Create an automated task](#)

[Create a bot](#)

[Editing TaskBots](#)

[Deleting a TaskBot](#)

[Run a task](#)

## Properties

Increase performance, efficiency, and usability of a task.

Task properties manage the running task, including whether the task is repeatable, the rate of replay, any notifications to be sent, hotkeys, security on the client machine, and analytics concerning the operation of the task. Use the Properties tab to set and adjust the settings for the task.

## Properties Tabs

**General**

View and edit general task properties, including:

**File Name**

Displays name of the task.

**Created at**

Displays the date and time of task creation.

**Status**

Displays the last time the task was run.

**View Log**

Click View Log to see historic and detailed status of the task.

**Last Run Time**

Displays the last time the task was run.

**Mouse Clicks**

Lists the total mouse clicks recorded in a task, automatically calculated based on the task.

**Keystrokes**

Lists the total keystrokes recorded in the task, automatically calculated based on the task.

**Total Clicks**

Lists the total clicks (Mouse Clicks + Keystrokes) recorded in the task. Automatically calculated based on the task.

**Priority (for queuing)**

Specify a priority for the task, which will decide the precedence of the task when it is in a queue.

Also, if the priority is same then rules apply for precedence of jobs.

**Timeout**

Specify timeout for the task to ensure that the task gets aborted automatically after the specified time. Timeout can be set only in minutes between 0 and 9999.

**Enable this task to run with other similar files or window titles**

By default, the task recorded will only run on the specific file(s) it was recorded on. (For example, a task recorded on the file abc.xls can run on def.xls, xyz.xls, or any other \*.xls file, without editing the task.)

**Description/Notes**

Add descriptions and notes for a task in the Description/Notes window.

**Repeat**

Specify the frequency or conditions to repeat the task.

**Speed**

Adjust the speed that the task runs.

**Notification**

To send an email message after the task has run.

**Hotkeys**

Assign a keyboard shortcut to launch the automated tasks.

**Security**

Set parameters to ensure that only authorized users run the task, that monitors do not display task related data, and disable the keyboard and mouse while the task runs.

**Analytics**

Enable sharing data for Analytics.

- [Set Timeout](#)

Specify the amount of time before the task will be aborted automatically.

- [Repeating a Task](#)

Repeat a task upon run failure or when running routine tasks.

- [Adjusting the Speed of a Task](#)

Use the Speed property to adjust the speed a task runs.

- [Sending email notifications](#)

Set up email notifications.

- [Setting up Hotkeys](#)

Launch tasks with the press of a single key.

- [Setting Security Features for a Task](#)

Security priorities prevent unauthorized access to sensitive information contained within tasks.

- [Enable analytics for tasks](#)

Analyze data that is available from bots to understand specific automation trends.

---

Related tasks

[Set Timeout](#)

Related reference

[Repeating a Task](#)

[Adjusting the Speed of a Task](#)

[Sending email notifications](#)

[Setting up Hotkeys](#)

[Setting Security Features for a Task](#)

[Enable analytics for tasks](#)

[Schedule](#)

## Set Timeout

Specify the amount of time before the task will be aborted automatically.

If a task gets stuck somewhere in the process, it will be automatically aborted if it doesn't get any response within the specified time. Once a task times out, any downstream tasks (the tasks in queue) can run smoothly.

Note: Timeout for a task is not applicable:

- When a task is manually paused.
- If the task is run in Debug mode.
- If the task is called through Run Task.
- When a low priority task is suspended and is resumed after completion of a high priority task.
- When first task in a process is paused, additional tasks are aborted and first task is resumed.

To set the timeout for a particular task, follow the steps mentioned below:

## Procedure

1. Select the task from the list.

2. Click the PROPERTIES tab.

Note: See historic and detailed status of a timed out task by clicking on View Log in General Properties for the specified task.

3. Enter the timeout period, in minutes.

Range of the Timeout is from 0 minute to 9999 minutes.

## Repeating a Task

Repeat a task upon run failure or when running routine tasks.

Select Repeat from the PROPERTIES tab for configurable options.

### Do Not Repeat

Default. The task runs once.

### Repeat

Repeats the task a number of times.

### Repeat until I stop it

Repeats the task until being stopped manually by clicking the stop button or by pressing the ESC key.

**Repeat for**

Repeats the task for a time period (hh:mm:ss).

Note: Specify up to 99 hours, 59 minutes, 59 seconds.

**Time between repeats**

Sets a duration of time to wait before repeating a task.

**Upon error, continue with next repeat**

The task is repeated regardless of run failure.

**Related tasks**[Set Timeout](#)**Related reference**[Properties](#)[Sending email notifications](#)

## Adjusting the Speed of a Task

Use the Speed property to adjust the speed a task runs.

Select Speed from the PROPERTIES tab for configurable options. Speed options include:

**Standard Replay**

The task runs at the same speed as when it was recorded.

**High-Speed Replay**

The task runs at a faster speed than was recorded.

**Turbo-Action Replay**

The task runs at the fastest speed and excludes any mouse moves.

Tip: Certain operational pauses during the recording of a process have implicit application-specific meaning.

In these cases, set the replay speed to the Standard Replay mode to ensure the most accurate replay.

**Related tasks**[Using the smart recorder](#)**Related reference**[Properties](#)[Using the Screen/Standard Recorder](#)[Using the Web Recorder](#)

## Sending email notifications

Set up email notifications.

Select Notification from the PROPERTIES tab for configurable options. Notification options include:

**Send email notification when task finishes**

Specify this option to trigger an email for the task upon completion.

**Email**

Supply the address of the recipient. If no address is specified, the default address will be used.

**Email Notification Template**

Access to notification templates.

**Email Settings**

Configurable email settings, including default email address.

Tip: To specify a single email address to notify, set it using the Tools Options Email Notification. Deployments requiring different tasks to send status emails to different email addresses, specify these email addresses for each task individually.

Related tasks

[Email Settings](#)

Related reference

[Setting Task Properties](#)

## Setting up Hotkeys

Launch tasks with the press of a single key.

Assign hotkeys to an automated task to enable the ability to launch a task with a simple keystroke.

Select Hotkey from the PROPERTIES tab for configurable options. Hotkeys options include:

Hotkey

Specify hotkeys in the field provided or select a hotkey from the available list.

Note: If a hotkey is being used by another process, it will be displayed as not selectable.

Related concepts

[Stopping a Task](#)

Related reference

[Properties](#)

[Scheduling Tasks to Run](#)

## Setting Security Features for a Task

Security priorities prevent unauthorized access to sensitive information contained within tasks.

Automation Anywhere provides advanced security for running tasks. Select Security from the PROPERTIES tab for configurable options. The Security options include:

Running this task in stealth mode

Use this option to prevent information from being displayed on the screen while the task is running in Auto-Login mode. Application windows and programs are hidden from the screen to avoid unauthorized users seeing the information.

Note: You can use the stealth mode only for the tasks that are recorded using the Web Recorder.

Disable mouse and keyboard for this task

Use this option to disable the computer mouse and keyboard while the task is running in Auto-Login mode. Unauthorized users are prohibited from gaining control of the computer while the task runs. If the computer recognizes an unauthorized user who is accessing the computer, Automation Anywhere automatically locks the computer.

Note: For this option to work you must ensure that the Run Task as an Administrator option is enabled in Tools Options Runtime Settings.

Tip: Use auto-login along with stealth mode in order to prevent unauthorized access as well as any information from being displayed on the screen while the task is completed.

Note: When nesting automation tasks, if a parent task runs a child task, the Auto-Login settings of the parent take effect, regardless of the settings of the child.

Related reference

[Properties](#)

---

Run a task

[Scheduling Tasks to Run](#)

## Enable analytics for tasks

Analyze data that is available from bots to understand specific automation trends.

By default, the Analytics option is enabled. To disable analytics for a specific task, click PROPERTIES and select Analytics and unselect the option.

When the task is marked for data analytics, the value type variables within the TaskBot are saved as Analytics Variables.

Related tasks

[Create new variables](#)

Related reference

[Properties](#)

## Schedule

Schedule automated tasks to run.

### Scheduling tasks from Enterprise client

Automated tasks and process workflows can be scheduled. Click the SCHEDULE tab in the Enterprise client to view configuration options:

Daily

Schedule for every day, only weekdays, or every two days, etc.

Weekly

Schedule for a specific day or days of the week.

Monthly

Schedule for specific day or days of the month.

One time only

Schedule the task to run only for a single event.

Upon start

Schedule task to run when the computer is started.

Upon login.

Schedule task to run upon logging in.

When the computer is idle

At points when the computer is idle, the task will be scheduled to run.

- [Schedule a task](#)

Schedule a task using the Scheduler.

Related concepts

[Auto Login](#)

Related reference

[Scheduling Tasks to Run](#)

[Using Advanced Settings](#)

## Schedule a task

Schedule a task using the Scheduler.

Select the task to schedule from the Task List.

## Procedure

1. Click the SCHEDULE tab.
2. Set the scheduling information for time, date, and frequency.
3. Click Save.
4. Provide credentials if prompted.

Note: If the credentials were previously saved in the Windows login credentials in Login Settings option, users may not be prompted.

## Next steps

Use the Current Task Schedule(s) table to set or remove additional times to run the scheduled task.

Related reference

[Schedule](#)

[Working with tasks](#)

[Scheduling Tasks to Run](#)

[Using the Schedule Manager](#)

## Trigger

Triggers enable a task to run automatically in response to an event that occurs on the computer, such as a new window opening or a specific file created.

Automation Anywhere supports the following types of triggering events, also referred to as actions:

### Window

Window triggers launch an automated task when an application window action takes place.

Automation Anywhere provides the list of open applications and enables refreshing the list at any time.

Select from the following options as the trigger event:

- When an application window opens.
- When an application window closes.

### File

File triggers launch the automated task when a file action takes place. Select from any of the following options as the trigger event:

- When a new file is created.
- When an existing file is deleted.
- When a file is renamed.
- When a file is modified.

### Folder

Folder triggers launch an automated task when events affect folders on the computer. Select from any of the following options as the trigger event:

- When a new file is created in the folder.
- When an existing file is deleted in the folder.
- When a file is renamed in the folder.
- When a new folder is created.
- When an existing folder is deleted.
- When a folder is renamed.
- When a folder is modified.

#### Performance

Performance triggers launch an automated task when specified computer resource criteria are met.

Select from the following options as the trigger event:

- The computer CPU usage reaches a level that you specify (in %).
- A certain amount of free disk space is reached that you specify in megabytes (MB).
- When a particular number of processes that you specify are running.

#### Process

Process triggers launch an automated task when a system process starts or stops. Select from either of the following options as the trigger event:

- When a process starts running.
- When a process stops running.

#### Service

Service triggers launch an automated task when a system service takes action. Select from any of the following options as the trigger event:

- When a service starts running.
- When a service stops running.
- When a service resumes running.
- When a service pauses.

#### Email Message

Email Message triggers launch an automated task when an email is received in the email account that you specify. To specify a trigger for new incoming email messages on a mail server, specify the following:

- Host name
- Port details
- User name
- Password
- A time interval to use between checking for new messages
- If the email account uses SSL, check Server Uses Secure Connection (SSL) .

## Recommendations for Using Triggers

Automation Anywhere recommends these guidelines with using triggers to run tasks:

- When running a task on a locked computer, use the Auto-login feature to unlock the computer when triggered.
- Assign a system variable to a trigger action that returns the name of the file, folder, or window that triggered the task.

---

Note:

- Triggers do not work on machines when in a logged-off state. However, state triggers can be executed if Auto-Login is enabled.
  - Triggers are applicable only in the local instance of the Enterprise client.
  - Triggers do not get uploaded with the task to the Enterprise Control Room and cannot be deployed.
- [Delete file triggers email notification](#)  
Run an automated task that sends an email.
- [Trigger Excel example](#)  
Set up an automated task each time a Microsoft Excel window opens.

Related concepts

[Auto Login](#)

Related tasks

[Delete file triggers email notification](#)

Related reference

[Schedule](#)

[Using the Trigger Manager](#)

## Delete file triggers email notification

Run an automated task that sends an email.

Run an automated task that sends an email whenever a file is deleted from a critical work folder on the computer.

## Procedure

1. From the Task List, select the desired task and click the TRIGGER tab.
2. For Trigger type, select Folder.
3. Select the Folder Name.  
Click on (...) to see more folders.
4. Select When any file is deleted from the actions list.
5. Click Save.  
When a file is deleted from the selected folder, the task will run and send a notification email.

Related reference

[Trigger](#)

[Sending email notifications](#)

## Trigger Excel example

Set up an automated task each time a Microsoft Excel window opens.

Run an automated task each time a Microsoft Excel window opens:

## Procedure

1. From the Task List, select the desired task and click the TRIGGER tab.
2. From the Window Title menu, select Evaluation Users - Excel.

- Note: If the window is not available in the list, open the application and click on Refresh.
3. Under Action, select When window opens.
  4. Save the trigger by clicking Save.
- The task will now run each time Microsoft Excel opens.

Related tasks

[Delete file triggers email notification](#)

Related reference

[Working with tasks](#)

[Trigger](#)

[Excel command](#)

## Create an automated task

Automation Anywhere provides several ways to create automation tasks.

### Selecting a Recording Method

When planning an automation task, select the recorder (or workbench) based on the type of process being automated. For example, for a process that is based on web applications to extract data from websites, select the web recorder.

To record a new task, click New.

A window displays several methods for record a task, including:

#### Screen Recorder

Record tasks that run on the same machine where the task is created by recording mouse clicks and keyboard operations. Screen recorder may be referred to as standard recorder in some legacy topics. Important: The Screen Recorder is the most basic recorder. Recorded tasks depend on the UI location and screen resolution. If conditions change related to the target application, recorded tasks may not work.

#### Smart Recorder

Captures common UI objects used in both Windows-based and web-based applications. The objects include common UI controls such as buttons, text fields, and combo boxes. Some of the related technologies include HTML, .Net, WPF, Java, Flex, and Silverlight. The UI objects are saved as a set of Object Cloning commands.

Tip: The Smart Recorder captures automated web application, but it is strongly recommended to use the Web Recorder to capture web-based content.

#### Web Recorder

Records web-only tasks. If website controls on a page change location, the task adjusts to run without error. If the properties of the web controls change, the automation task can be updated to ensure that the task runs successfully.

Tip: Web Recorder only works with Internet Explorer. Automate web applications with other browsers such as Google Chrome or Microsoft Edge using Workbench.

#### Workbench

Create tasks manually. Assign relevant actions to the task using the commands provided in the editor.

- [Record a task](#)

Record simple tasks that run on the computer.

- [Run a task](#)  
Test an automated process by running the task.
- [Send a task](#)  
Distribute automated tasks to other people and or locations.
- [Copy or Rename a Task](#)  
Copying and renaming automated tasks reuses commonly recorded tasks.

#### Related tasks

[Using the smart recorder](#)

[Smart recording example](#)

#### Related reference

[Using the Web Recorder](#)

[Secure recording mode](#)

[Setting up Hotkeys](#)

[Using the Workbench](#)

[Best practices for recording tasks](#)

## Record a task

Record simple tasks that run on the computer.

Automation Anywhere records activities, including keystrokes, mouse movements and mouse clicks. Before recording task, take these best practices into consideration:

- Avoid using mouse clicks
- Use keystrokes and shortcuts when possible
- Maximize all windows
- Avoid clicking applications that are not part of the process you want to record and automate
- Record the task at low speed
- Avoid dragging windows while recording
- Avoid double-clicking on application icons to start applications while recording

## Procedure

1. Click Record.  
The Enterprise client window disappears from view, and a small Stop Recording window appears.
2. Perform the actions to record.  
Open applications, new windows, and or click on buttons, fill in forms, search a website, etc.
3. Click Stop.  
Stop when finished recording the task. The Save Task window is displayed.
4. Enter the directory name to save the recorded task.  
Supply name or accept the default directory, My Tasks.
5. Enter a name for the recorded task.  
Optionally, select Create Shortcut on Desktop to provide a shortcut on the desktop to run the recorded task.  
Note: Create the shortcut after saving the task as follows:
  - a) In the Enterprise client window, select the task in the Task List.
  - b) Right-click on the task, and choose Send To Desktop (Create Shortcut).
6. Save the task.  
If necessary, enter a password to protect the task.

- [Using the smart recorder](#)

Use the Smart Recorder to record the capturing of objects from applications such as HTML, Java, WPF, Flex and Silverlight.

- [Using the Web Recorder](#)

Automate tasks that involve a web applications or browsers.

- [Secure recording mode](#)

Secure recording prevents the capturing of any sensitive data.

- [Best practices for recording tasks](#)

Follow these suggested best practices to record and run tasks.

Related concepts

[Stopping a Task](#)

Related tasks

[Smart recording example](#)

Related reference

[Secure recording mode](#)

[Editing TaskBots](#)

[Scheduling Tasks to Run](#)

[Run a task](#)

[Best practices for recording tasks](#)

## Using the smart recorder

Use the Smart Recorder to record the capturing of objects from applications such as HTML, Java, WPF, Flex and Silverlight.

Capture actions through an object window and save the keystrokes and mouse clicks in the Actions list for the Object Cloning command in the Workbench.

Note: Special keystrokes such as Tab and Enter are saved as separate actions within the command.

Tip: To navigate across controls, it is recommended that you use Click actions instead of TAB.

To create an automation task using the Smart Recorder:

## Procedure

Select Smart Recorder.

From the Record button list, click on the  beside Record button to make selection.

Note: Other ways to select the smart recorder:

Choose an Option

Click on New Task button.

Select Smart Recorder.

Menu in System Tray

Click the Enterprise client in the System Tray.

Select Record.

Short-cut keys.

Ctrl + Alt + R.

- [Smart recording example](#)

Useful, specific automation example using the Smart Recorder.

Related tasks

[Smart recording example](#)

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Related reference

[Object Cloning command](#)

[Secure recording mode](#)

[Editing TaskBots](#)

[Using the Workbench](#)

[Scheduling Tasks to Run](#)

## Smart recording example

Useful, specific automation example using the Smart Recorder.

Capture the manual task of changing the timezone settings from the system control panel on a PC laptop.

The following is a general example of how this task can be automated.

### Procedure

1. Navigate to and open the system control panel.

Staging the action to record. In this case, the action to record is the act of selecting a link from the control panel window.

2. Navigate to Enterprise client and click New.

3. Select Smart Recorder.

4. Click Record.

5. Select Control Panel from the list and click Start.

The task is now being recorded. Proceed with the process to be automated. For this specific example, the following actions will be recorded.

- a) Click Date and Time in the control panel window.

- b) Select Clock and Region.

- c) Click Change the time zone.

- d) Click Change time zone....

- e) Select Time zone from the list.

- f) Click OK.

- g) Click OK on the Date and Time window. This represents the final recorded step in this task.

6. Click Stop to stop recording.

Users are prompted to save the recorded task.

7. Specify the file name and directory. Click Save.

### Next steps

The entire session has been recorded as a series of objects which may be viewed and edited in the Workbench.

Related reference

[Editing TaskBots](#)

[Saving a TaskBot](#)

[Using the Workbench](#)

[Create a bot](#)

[Deleting a TaskBot](#)

[Copy or Rename a Task](#)

## Using the Web Recorder

Automate tasks that involve a web applications or browsers.

Web Recorder captures the following actions:

- Open web pages.
- Log onto a website.
- Navigate through search results.
- Enter data and submit forms.
- Extract data and update database records.
- Use a Web-based ERP (Enterprise Resource Planning) system.
- Extract web data to a local file.
- Test an online applications.

Note: If the layout of a web page changes, and the web controls move to a different location on the page, Automation Anywhere is capable of locating new positions and run the task correctly.

Related concepts

[Extracting Data from Websites](#)

Related tasks

[Record a task](#)

Related reference

[Using the Workbench](#)

[Scheduling Tasks to Run](#)

## Secure recording mode

Secure recording prevents the capturing of any sensitive data.

## Commands that support Secure Recording Mode

[App Integration](#)

Images are not captured.

[Delay/Wait](#)

Images are not captured.

[Error Handling](#)

Images are not captured.

[IF/ELSE](#)

Images are not captured.

[Image Recognition](#)

Image1 is not saved and Image2 is not captured.

[Manage Windows Controls](#)

No values are captured.

[Mouse Command](#)

Images are not captured.

[Object Cloning/Smart Recorder](#)

No values or images are captured. Clicking Re-Capture Image, images are not captured. Image Option and Save commands are not supported.

[OCR](#)

No images are captured for preview.

## [Screen Capture](#)

Screen shots are disabled. If the user tries to save the image, a warning message will appear, reminding the user to ensure that the captured image does not contain sensitive data.

## [Web Recorder](#)

No values, caption, or default texts are captured. No values are captured for Extract Data and Extract Multiple Data.

## [Workbench](#)

Visualize and SnapPoint buttons disabled.

Note: If a task is recorded when secure recording is disabled before enabling secure recording for the same task and opened with the Workbench, the object values and images will still be visible.

### Related reference

[Using Advanced Settings](#)

[Using Run-time Settings](#)

[Delay/Wait command](#)

[Error Handling command](#)

[IF/ELSE command](#)

[Image Recognition command](#)

[Manage Window Controls command](#)

[Object Cloning command](#)

[OCR Command](#)

[Screen Capture command](#)

[Web Recorder command](#)

## Best practices for recording tasks

Follow these suggested best practices to record and run tasks.

## Best Practices

### Avoid using mouse clicks

While recording, use keystrokes and shortcuts as much as possible, even if objects or icons have moved position.

### Use keystrokes and shortcuts when possible

Keystrokes are more reliable and consistent to record. Shortcuts minimize the dependency on mouse clicks and mouse moves. Find keyboard shortcuts in application menus, or press Alt on your keyboard to view shortcuts highlighted on screen.

### Maximize all windows

Maximized windows to ensure that those windows and corresponding web objects are easily located.

### Avoid clicking applications that are not part of the process

Including an application that is not part of the automation process, and that application is not open when the task is later run, an error Application not found. occurs.

### Record the task at low speed

To ensure that tasks do not skip steps while running, record the task at a reasonable speed that gives all applications the necessary time to open and process operations completely.

### Avoid dragging windows while recording

Automated processes typically do not include window actions, like minimizing, maximizing, or moving a window.

### Avoid double-clicking on application icons to start applications while recording

Open the recorded task in the Workbench and use Open Program and Open File commands and then replace any recorded mouse clicks.

Here are additional best practice topics:

- [Extracting Data from Websites](#)

Extracting data from web pages can take one of four forms, depending on the type of data that requires extracting:

- [Extracting Pattern-Based Data](#)

When you need to extract data, which for instance, is spread over multiple pages and contains elements such as links you can use the 'Pattern Data' option in Extract Data .

- [Extracting Regular Web Data](#)

Complete the steps to extract regular data from a web site.

- [Extracting Table Data](#)

When you need to extract data from tables on web pages, the Web Recorder guides you with visual steps.

- [Using the Screen/Standard Recorder](#)

Use the Screen Recorder to record a task or series of actions on your computer.

Related tasks

[Smart recording example](#)

[Record a task](#)

Related reference

[Create an automated task](#)

[Run a task](#)

[Open Program/File command](#)

## Extracting Data from Websites

Extracting data from web pages can take one of four forms, depending on the type of data that requires extracting:

- Regular data: Unstructured data that has no repetitive patterns. An example is a paragraph of text.
- Pattern-based data: Structured data that repeats a pattern, such as a row in a table or a list.
- Table data: Data that resides in a table.

Related reference

[Extracting Regular Web Data](#)

[Extracting Pattern-Based Data](#)

[Extracting Table Data](#)

## Extracting Pattern-Based Data

When you need to extract data, which for instance, is spread over multiple pages and contains elements such as links you can use the 'Pattern Data' option in Extract Data .

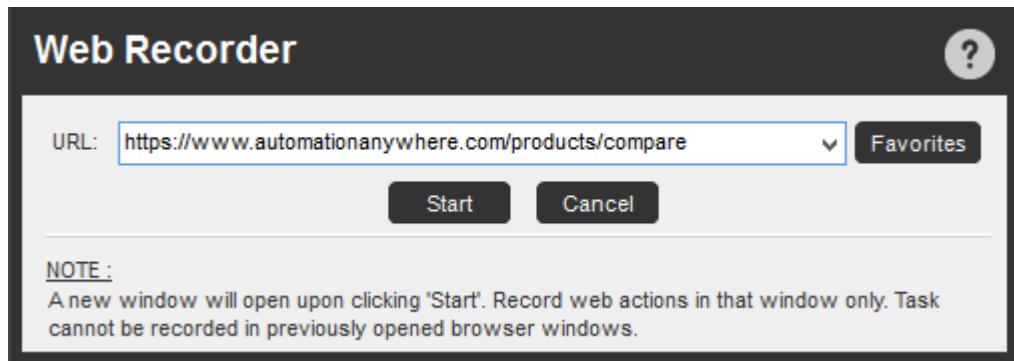
To extract pattern-based data from a web site, follow these steps:

1. In the Automation Anywhere main window, launch the Web Recorder in one of the following ways:

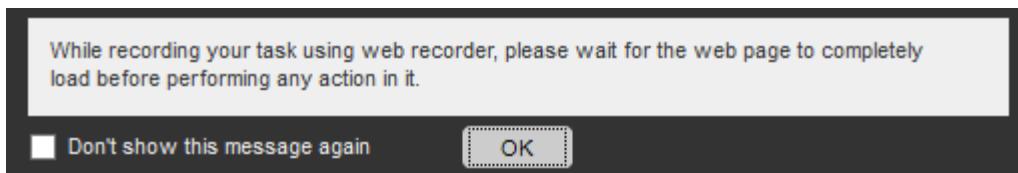
- Click the New button and select Web Recorder.

- Click on the Web Recorder link at the top.
- Click on the Tools menu and select Web Recorder.

The initial Web Recorder window is displayed:



2. The program displays the 'Web Recorder Tip' window:



Note: Select 'Don't show this message again' if you do not wish the program to display the tip.

The Web Recorder Toolbar is displayed, and Internet Explorer is launched in a new window with the website.



Note: This feature works with Internet Explorer only.

3. You can now perform any actions you like, including mouse clicks and text entry. When you need to extract regular data from the website, click the Extract Data button on the Web Recorder toolbar.

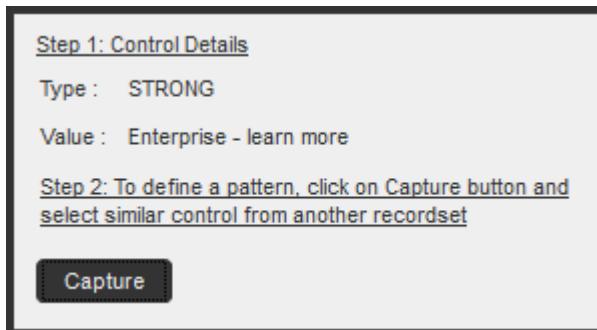
The Extract Data Option window is displayed.



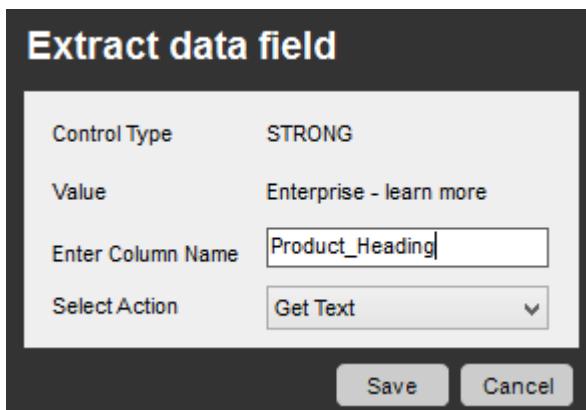
4. Select the Pattern-based Data radio button and click Next.
5. You can now highlight the data you want to extract

**Please click on the data you want to extract. Press 'Esc' to cancel and continue recording.**

6. Use it to set a pattern:
  - a) Highlight the first line of text and click on Capture in the window that pops up:

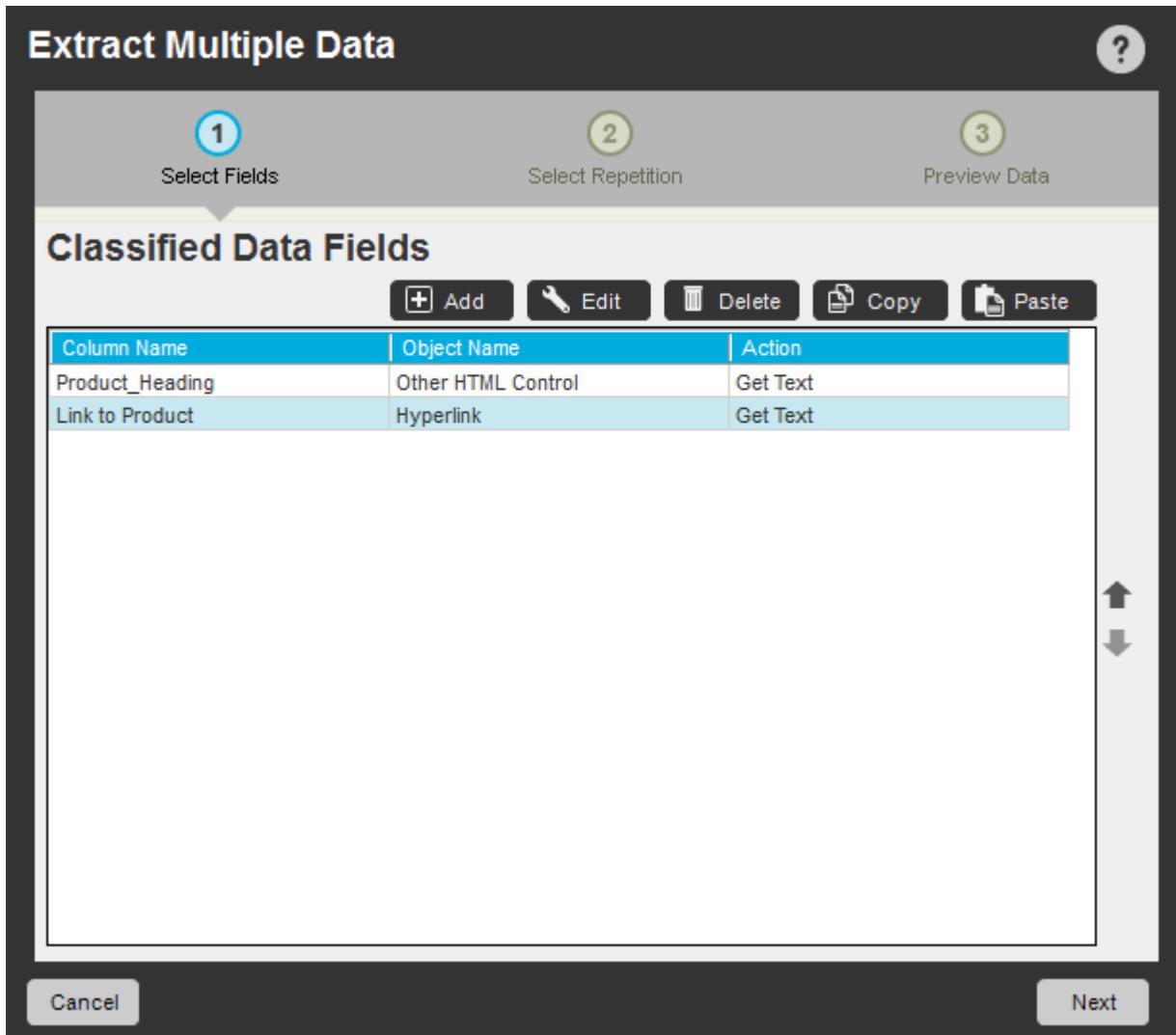


- b) Highlight a second line of text. This will set the pattern. The Extract Data Field window is displayed.



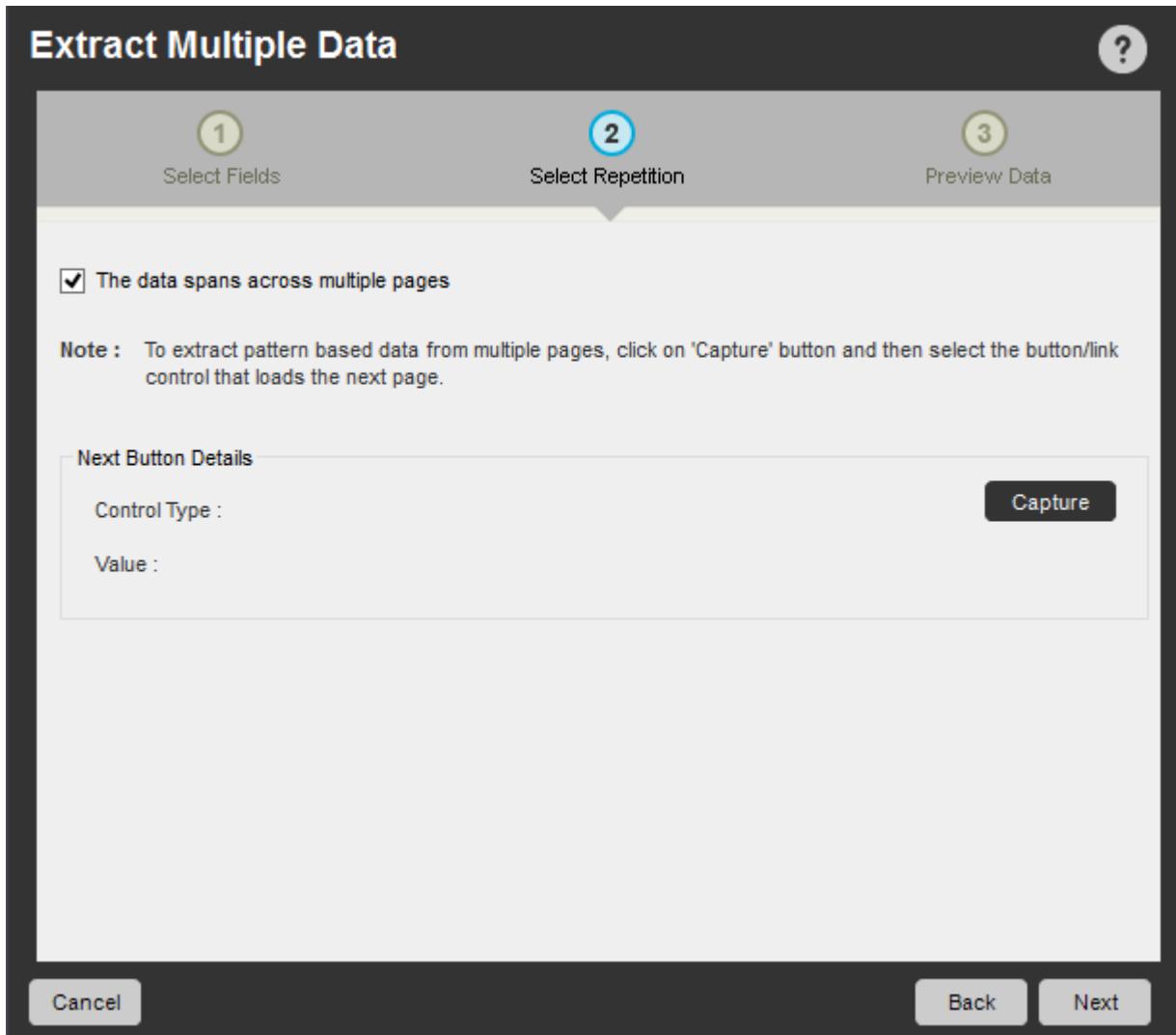
- c) Enter a name in the "Enter Column Name" field and click Save.

- The Extract Multiple Data window is displayed, containing the column name you saved.

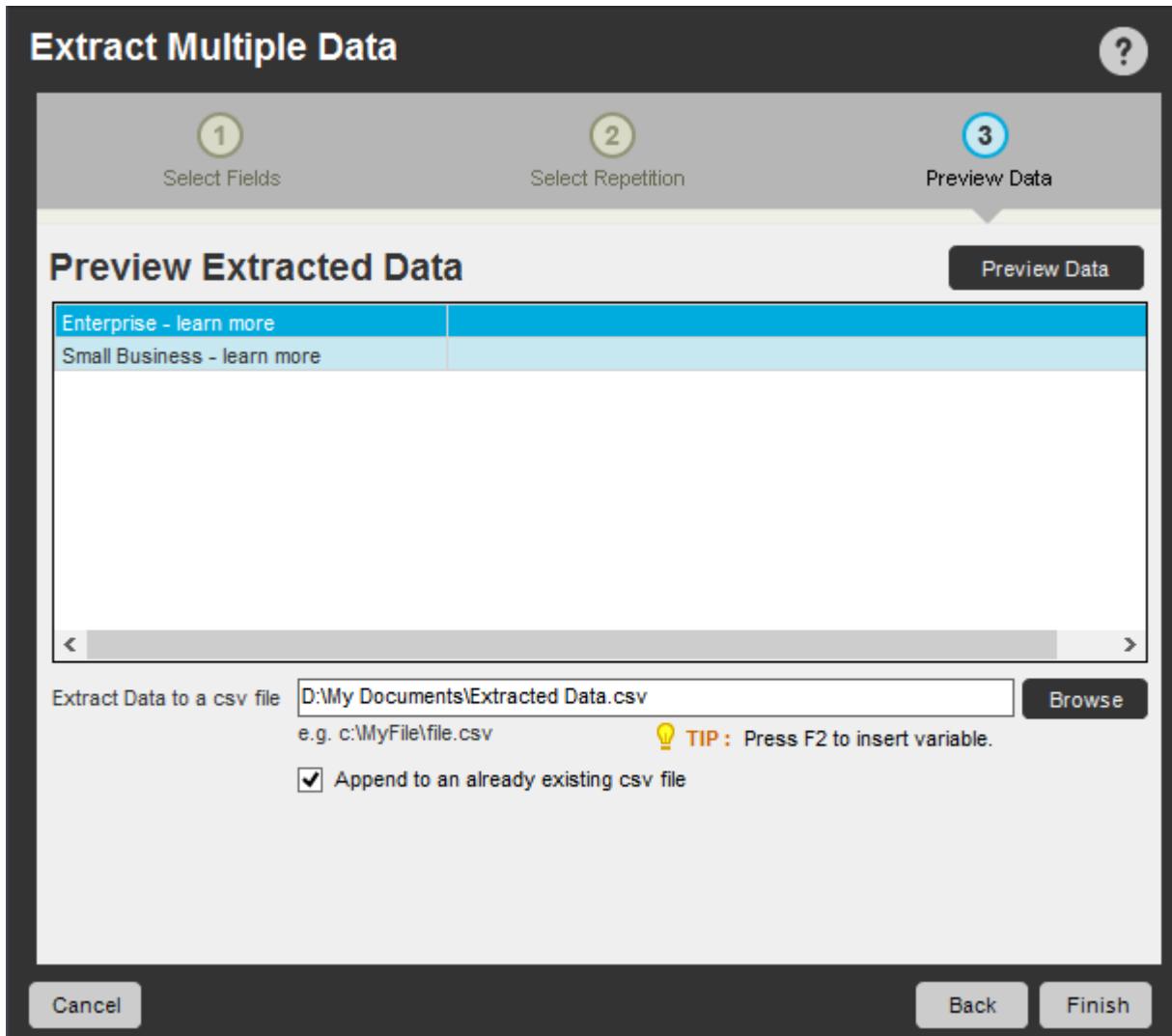


- In the Extract Multiple Data window, you can do several things:
- Add: Click the Add button to select additional data from the website and add another pattern that you want to capture. The data fields will be automatically viewed in the Classified Data Fields.
- Edit: Click the Edit button to change the name of the pattern.
- Delete: Click the Delete button to delete one or more patterns.
- Copy: Click the Copy button to copy one or more patterns.
- Paste: Click the Paste button to paste one or more copied patterns.
- Click Next when done.

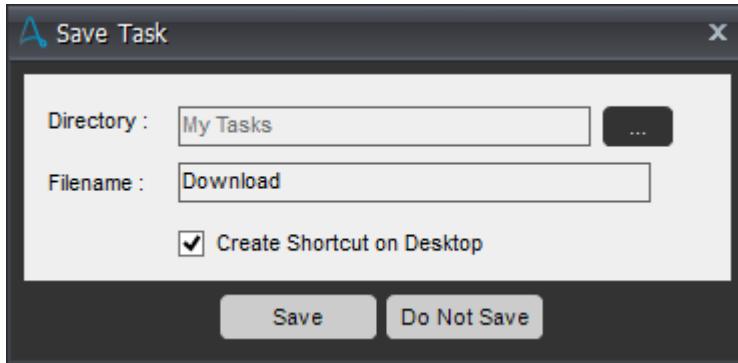
The second window of Extract Multiple Data is displayed:



- If the website has multiple pages from which you want to extract the patterned data, click the check box: "The data spans across multiple pages".
- Use the Capture button to capture the control name for moving to the next page. Images extracted from multiple web pages are saved in different folders.
  - Click Next when done. The Preview Data section is displayed:



- The Preview Data section displays a preview of the captured data. Save extracted images or data as CSV files in separate folders, as required.
- Click Finish.
- Click the Stop Recording button on the Web Recorder toolbar.
- The Save Task window pops-up, wherein you can specify a task name. Optionally select a folder in which to save the task and click save.



 Note: The trial version supports extracting 5 pages of data for viewing only. No such limitation exists in the purchased version.

#### Related reference

- [Extracting Regular Web Data](#)
- [Extracting Table Data](#)

## Extracting Regular Web Data

Complete the steps to extract regular data from a web site.

1. In the Automation Anywhere main window, launch the Web Recorder in one of the following ways:
  - Click the New button and select Web Recorder.
  - Click the Web Recorder link at the top.
  - Select Tools > Web Recorder.

The initial Web Recorder window opens.

2. Enter the website address (URL) from which you want to extract data, and click Start.

The program displays the Web Recorder Tip window:

Optionally, select Don't show this message again to not have the program display the tip.

The Web Recorder Toolbar opens, and Internet Explorer is launched in a new window with the specified website.

Note: This feature works with Internet Explorer only.

3. You can now perform any actions you like, including mouse clicks and text entry. When you need to extract regular data from the website, click the Extract Data button on the Web Recorder toolbar.

The Extract Data Option window is displayed.

4. Select the Regular Data radio button and click Next.
5. You can now highlight the data you want to extract.

**Please click on the data you want to extract. Press 'Esc' to cancel and continue recording.**

6. After highlighting the text, the Extract Data window opens, and contains the text you selected.
7. Save this copied text to an existing variable in your task.

8. Optionally, save the control URL either as a new variable or to an existing variable in your task.
9. You can also assign Before and After Keywords for extracting data.
10. Click Save.
11. Click the Stop Recording button on the Web Recorder toolbar.
12. The Save Task window pops-up, wherein you can specify a task name. Optionally select a folder in which to save the task and click Save. You can also optionally specify a password to prevent the task from being run by unauthorized users.
13. Click Save.



Tip:

1. To stop a running task, press and hold the escape (ESC) key for 2-3 seconds.
2. You can also configure your own hot keys to stop tasks.

Related reference

[Extracting Pattern-Based Data](#)  
[Extracting Table Data](#)

## Extracting Table Data

When you need to extract data from tables on web pages, the Web Recorder guides you with visual steps.

Many websites have data organized in HTML tables. Extract Table makes it easy to save tabular data in a CSV (comma-delimited) file that you can open in most spreadsheet and database applications, including Excel and Access.

1. Launch the Web Recorder:
2. Enter the website address (URL) on which you want to extract data, and click Start.

The program displays the 'Web Recorder Tip' window:

Optionally, select Don't show this message again to not have the program display the tip.

The Web Recorder Toolbar opens, and Internet Explorer is launched in a new window with the specified website.

3. You can now perform any actions you like, including mouse clicks and text entry. When you need to extract or copy table data from the website, click the Extract Table button on the Web Recorder toolbar.
4. Move the yellow prompt bar to the table you want to extract and click on it.

**Click on the table you want to extract from the page. Press 'Esc' to cancel and continue recording.**

Note: If the content you select is not a table, the yellow prompt bar changes to red.

The Extracted Table window opens and shows a preview of the data within the table.

5. If the table spans multiple web pages, click the check box The table spans across multiple pages.

Use the Capture button to capture the control name for moving to the next page.

6. Click Next when done to preview and save the extracted table.

- 
7. Save the table as a CSV (comma-separated) file into a location of your choice.

Optionally, use the Append to an existing CSV file check box to append the extracted data to an existing CSV file.

8. Click Finish.
9. Click the Stop Recording button on the Web Recorder toolbar.
10. In the Save Task window, specify a task name, optionally select a folder in which to save the task, and click Save. You can also optionally specify a password to prevent the task from being run by unauthorized users.

Note: The trial version supports extracting 5 pages of data for viewing only. No such limitation exists in the purchased version.

Related reference

[Extracting Regular Web Data](#)

[Extracting Pattern-Based Data](#)

## Using the Screen/Standard Recorder

Use the Screen Recorder to record a task or series of actions on your computer.

To record a task or a series of actions on your computer, use the Screen Recorder when:

- Building simple tasks for processes that involve mouse clicks and keyboard operations.
- You plan to run the automated process (the recorded task) on the same computer on which it was recorded. This ensures that the screen display coordinates are the same as they were when the task was recorded.

Note: Enterprise client supports as 1366X768 minimum screen resolution.

### Recording a Task using the Screen Recorder

To create an automation task using the Screen Recorder, launch it one of four ways:

Note: 'Screen Recorder' should already be selected as the default recorder in the 'Record' list-down for options 3 and 4 to work.

1. Using the 'Record' button list-down
  - In the main window, click on the 'Down Arrow' beside Record button at the top.
  - Select 'Screen Recorder' as shown:
2. Using 'Choose an Option'
  - Click on New Task button:
  - Select Screen Recorder from the 'Choose an option' dialog:
3. Using 'Record' option from Context menu in System Tray

- Context click the Enterprise client in the System Tray
  - Select Record.
4. Using short-cut keys 'Ctrl + Alt + R'
- The Automation Anywhere window is minimized, and the Recording toolbar is displayed in the lower right corner of your computer screen.

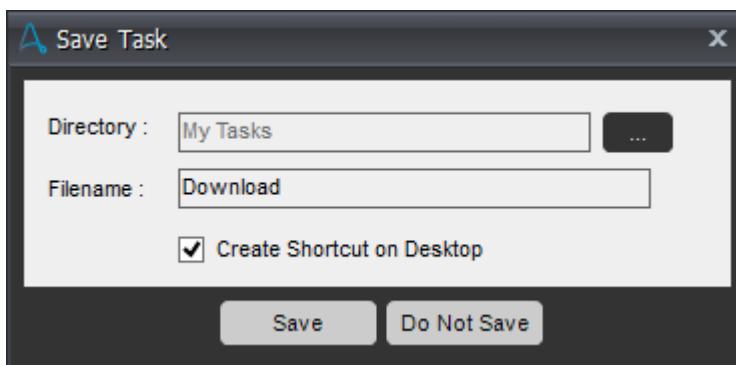
Note: If needed, you can pause the recording operation and resume it.

- Perform all of the actions on the computer that you want to record in the task.

Note: While recording, the Screen Recorder recognizes the various windows that are open on your desktop.

When done, click on the Stop button on the Recording toolbar.

- Save the task by specifying a name, and optionally select a folder in which to store it. When saved, the task name is displayed in the main Task List window.



Note: You can edit your recorded task using the Workbench. Refer '[Editing TaskBots](#)'.

If Version Control is enabled, a plus sign (+) will be prefixed to a new task.

Note: If you enable 'Secure Recording mode', no images are captured.

Related reference

[Using the Workbench](#)

[Editing TaskBots](#)

[Run a task](#)

[Open Program/File command](#)

[Manage Window Controls command](#)

## Run a task

Test an automated process by running the task.

## Run TaskBots

The run time window displays when a TaskBot begins to run. It has the following information relevant to the TaskBot:

- The selected and current task being executed.
- Actions being performed.
- The task line number.

To manually run a task, follow these steps:

1. From the Enterprise client, select the task to run.
2. Run the task by using one of these methods:
  - a) Click Run.
  - b) Navigate the File menu and select Run.
  - c) Click Actions and select Run from the list.
  - d) Right-click on the task and select Run.

**Tip:** The run time window is hidden from view if the option Show Run Time Window is not selected in the Tools > Options > View menu.

## Pausing and stopping tasks

To pause or stop a task from running at any time.

### Pause

To pause the task, press the Pause in the Run Time Window.

### Stop

When stopping a task, the process does not end abruptly. The Run-Time window displays the message "Aborting" while completing any steps in progress. To stop a task from running, use one of the following methods:

1. Use the Stop button.
2. Press Esc on the keyboard.

**Note:** Modify your hotkeys to use a different key to stop tasks that are running.

Related reference

[Troubleshooting Excel Command Tasks](#)

[Setting up Hotkeys](#)

## Send a task

Distribute automated tasks to other people and or locations.

Using the Send To option, send tasks to the following locations:

### Desktop

Create a desktop shortcut to run the task.

### Email

Send the task using an email address.

**Startup folder**

Enable the process to run each time the computer starts.

**My Documents folder**

Organize and run tasks from the My Documents folder.

To send a task to any of these locations, follow these steps:

## Procedure

1. Select the task from the list.
2. Either click the Edit menu or on the Actions button, and select Send To.

Option	Action
Desktop	Create a desktop shortcut to run the task.
Mail Recipient	Send the task using an email address.
Startup Folder	Enable the process to run each time the computer starts.
My Documents	Run tasks from the My Documents folder.

**Related tasks**

[Record a task](#)

[Locating a Task](#)

**Related reference**

[Run a task](#)

[Sending email notifications](#)

## Copy or Rename a Task

Copying and renaming automated tasks reuses commonly recorded tasks.

### Copy

To copy a task, follow these steps:

1. Select the task from the list.
2. Copy the task using one of the following methods:

File menu

    Select Copy.

Click Actions

    Select Copy.

Right-click on the task

    Select Copy.

3. In the Copy Task window, select a Directory location and specify the Filename for the copy.
4. Click Save.

The new task is added to the Task List.

## Rename

To rename a task, follow these steps:

1. In the Task List, select the task to rename.
2. Rename the task using one of the following methods:

File menu

Select Rename.

Click the Actions button

Select Rename.

Right-click on the task

Select Rename.

3. In the Rename File window, specify the new file name.

4. Click Save.

The renamed task is displayed in the Task List.

Related tasks

[Record a task](#)

Related reference

[Working with tasks](#)

[Create an automated task](#)

[Run a task](#)

[Using the Workbench](#)

## Stopping a task manually

While running an automated task, you can pause or stop the process manually from the progress window.

To stop a task manually, click the Pause  or Stop  button on the progress window, or press the Escape (ESC) key on the keyboard for 2-3 seconds.

To stop an automation task running on a Bot Runner machine remotely from the Enterprise Control Room the user must have the manage activity permission.

- From the Enterprise Control Room, if you stop an automated task that is prompting for input or when an error message or any other message is displayed, then the message box, prompt or error window closes automatically, and the task is aborted. If there is a bot in queue, the next bot starts.
- When the Auto-Login option is used, and you stop the task running on a Bot Runner machine from the Enterprise Control Room, then the message box, prompt or error window closes, the task is aborted AND the machine is restored to its original state.
- If an error occurs in a task running on a Bot Runner machine, and you stop the task from the Enterprise Control Room, the error message is displayed in the Audit log details section of the Enterprise Control Room.

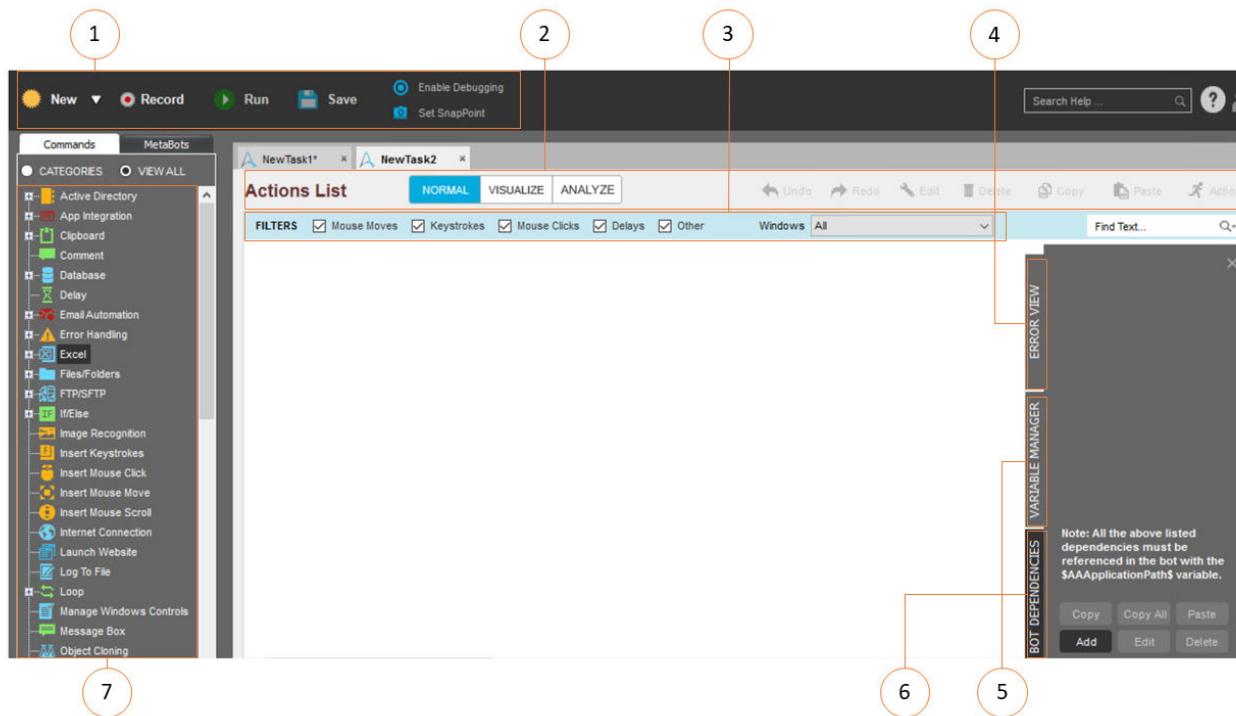
Related reference

[Stop Task command](#)

# Tour of the Workbench

The Workbench provides all the tools required for building, customizing, and enhancing automated processes using drag-and-drop operations.

The Workbench contains the following components of the user interface:



1. Actions buttons: Create, Record, Run, or Save TaskBot and MetaBot logic. Users can also [debug](#) and [set SnapPoint](#).

**11.3.3** The Record, Enable Debugging, and Set SnapPoints options in the Workbench are not available for a protected bot.

2. Actions List: Shows multiple TaskBot and MetaBot Logics side by side using the tabs at the top of the Actions list to enable users to copy and paste commands between multiple TaskBot and MetaBot Logics.

At low screen resolutions, the Undo, Redo, Edit, Delete, Copy, and Paste buttons might not appear correctly. To do those actions at a low resolution, use the Actions menu.

Use the Normal, Visualize, and Analyze tabs to switch views for TaskBot details:

- Normal: Screenshot view of the task.
- Visualize: Flowchart of the task process.
- Analyze: Bot Insight dashboard for data analysis.

Note:

- The Normal, Visualize, and Analyze tabs are not available for MetaBot Logic.
- **11.3.3** You can not view, add, edit, copy, paste, or delete the commands of the protected bot and the commands list is not shown in the Actions List screen.
- **11.3.3**

The Visualize tab does not display snappoints or images captured during recording for protected bots. Instead the following message is shown:

You cannot set SnapPoints or visualize the images of this bot as it is protected however you can view or edit the variables value and/or view the bot dependencies only.

3. Filters: Enables you to customize your view of the Workbench to focus on specific commands in an automation. This is helpful for managing long tasks.

Note:

- Filters are available only for TaskBots.
- **11.3.3** The Filters options is not available for a protected bot.

4. Error view: Manages errors that might occur in a task. The panel is automatically updated when commands are added and edited.

**11.3.3** The Error View does not show the actions for protected bots.

5. Variable manager: Shows [user-defined](#) and [system](#) variables that you can use in automation tasks. Use this panel to Add, Edit, Copy, Paste, and Delete variables.

**11.3.3** For a protected bot, you cannot:

- Add any new variables or edit existing variable attributes using Add and Edit options.
- Paste variables in the protected bot that are copied from another TaskBot.
- Delete any existing variables using the Delete option.

6. Bot dependencies: Exports TaskBot-dependent files and automatically uploads them to the Enterprise Control Room for deployment when the TaskBot is running.

Automation Anywhere supports the following file types: atm, bmp, csv, doc, docx, exe, jpg, pdf, pkx, png, mdb, txt, xls, xlsx, and xml.

**11.3.3** The Bot Dependencies of the protected bot are visible. However, you cannot add, edit or delete any of the bot dependencies.

7. Commands panel: Holds hundreds of commands to build and edit TaskBot and MetaBot Logics. Drag, drop, move, and edit these commands in the Actions List panel.

The Commands panel supports arrows (←, →), Tab, and Enter keys to insert commands.

Tip: Type the first letter of a command to highlight it in the list.

- [Customizing the Task List](#)
- [Changing Window Titles](#)

If you record a task with an application for which the window title changes frequently, use the Workbench commands for updating the task to refer to the proper title.

- [Using Caps Lock in Your Tasks](#)

When you create a new automation task, Automation Anywhere records the state of the Caps Lock key during the recording. When running the task, Automation Anywhere changes the state of Caps Lock key to match the state that existed prior to recording the task.

- [Inserting TaskBot / MetaBot Logic](#)

- [Editing Multiple Commands \(Bulk Edit\)](#)

To make editing automation tasks easier, Automation Anywhere provides a Bulk Edit feature, which enables you to edit multiple commands at one time. Bulk Edit works with two command types: Delays and Keystrokes.

- [Saving a TaskBot](#)

You can use the Save as a text file and Save as XML file options to save a TaskBot that is in edit mode in the Task Editor. When you save the TaskBot (.atmx file) as an XML file, information such as task properties, variables, and commands are saved. However, if you save it as a text file, these are not saved.

- [Deleting a TaskBot](#)

As a Bot Creator with access privileges to particular folders, you might want to delete an existing automation TaskBot.

Related concepts

[Viewing and playing protected bots](#)

Related reference

[Using the task Actions List](#)

[Using filters in the Workbench](#)

[Using the Error View](#)

[Using the Variable Manager](#)

[Manage bot dependencies](#)

[Commands](#)

## Customizing the Task List

Click View and select Columns Displayed to customize the Task List. Customization options include:

Add column

Select a column from the list and click Add.

**11.3.3** By default, the Protection Type column is hidden in the Task List. To ensure if the bot is protected, add the column using this option. The Protected and Unprotected values are shown for the MetaBots in the My MetaBots folder and the TaskBots in the My Tasks sub-folder under the Bot Store folder. For files in all other folders, the value appears as N.A.

Remove column

Select a column from the list and click Remove.

Note: The File Name column is required and cannot be removed from view.

Reorder columns

Use the Move Up and Move Down buttons to change the column position.

Save

Click Save to save any changes to the Task List.

Cancel

Click Cancel to clear any changes.

Reset

Click Reset to restore the default column settings in the Task List view.

Note: The default column order is: File Name, Type, Repeat, Status, and Last Run Time.

- [Locating a Task](#)

Locate the task file associated with an automated task.

Related tasks

[Locating a Task](#)

---

Related reference

[Working with tasks](#)

[Copy or Rename a Task](#)

[Run a task](#)

## Locating a Task

Locate the task file associated with an automated task.

To locate an Automation Anywhere task file:

Note: Automation Anywhere files have the file extension of .atmx.

## Procedure

1. Select the task.  
From the Task List, select the task file.
2. Click Edit.
3. Select Locate on Disk.  
The file folder with the task files is displayed.

Related concepts

[Stopping a Task](#)

Related tasks

[Send a task](#)

Related reference

[Customizing the Task List](#)

[Working with tasks](#)

[Run a task](#)

[Copy or Rename a Task](#)

## Changing Window Titles

If you record a task with an application for which the window title changes frequently, use the Workbench commands for updating the task to refer to the proper title.

For instance, several scenarios can exist:

1. The window title of a web page or a Windows application changes continuously due to dynamic content.
  - The title in Microsoft Outlook changes frequently as the user selects new folders.
  - A web page title contains a session ID for the website.
2. If you copy a recorded task to create a new task, the application titles will need to be changed.
3. When you use a wild card, the Current Active Window command, or variables to use for setting window titles.

Note: You can use the Windows filter to select a particular Window name, enabling you to view task actions that are sorted by application. This filter provides a convenient view of any or all applications that are used in your task.

## How to use the Change Window Title action

1. In the Workbench, use the Windows filter to select a particular Window name.
2. Select one or more commands with the window title.
3. Right-click on one of the selected windows commands and click Change Window Title.

You can also use the Actions button to select the Change Window Title option.

4. Set a common Window title for the selected windows that you want to change and click OK.

The windows titles are changed to the new title that you've assigned.

## Assign a common window title to multiple window actions

1. Open the task in Workbench.
2. In the drop-down list of the Windows filter, select an application window.
3. While holding down the Control key, click on multiple windows commands to edit their window titles.
4. Right-click on one of the selected commands, and click Change Window Title.
5. In the Change Window Title dialog, specify a window title to replace the current selected window titles.
  - Use the Find and Replace commands to browse and replace the title, as appropriate.
6. Click Save.

The windows titles are changed to the new title that you've assigned.

### Related reference

- [Editing TaskBots](#)
- [Deleting a TaskBot](#)
- [Changing Window Titles](#)

## Using Caps Lock in Your Tasks

When you create a new automation task, Automation Anywhere records the state of the Caps Lock key during the recording. When running the task, Automation Anywhere changes the state of Caps Lock key to match the state that existed prior to recording the task.

As a best practice, make sure that the Caps Lock key is turned OFF prior to creating your automation tasks.

## Recording with Caps Lock ON

If the Caps Lock key is turned ON when you start recording, Automation Anywhere records the task with Caps Lock ON.

When you run this task:

- Automation Anywhere checks the state of the Caps Lock key.
- If the Caps Lock key is OFF at the time it is run, Automation Anywhere turns Caps Lock to ON before running any of the steps.
- If you use Insert Keystrokes commands within the task, upon running the task Automation Anywhere toggles the state of Caps Lock to OFF, resulting in lowercase characters.

## Recording with Caps Lock OFF

If the Caps Lock key is turned OFF when you start recording, and you use Insert Keystrokes commands within the task to type uppercase characters, Automation Anywhere turns Caps Lock ON.

Note: Be aware that when you use Insert Keystrokes commands, no indicator exists for changes to the Caps Lock key status. Changes are carried out internally.

Related tasks

[Debugging TaskBot](#)

Related reference

[Insert Keystrokes command](#)

## Inserting TaskBot / MetaBot Logic

### Insert TaskBot Logic in the Workbench

Open a TaskBot using any of the following ways:

- Select a TaskBot from the My Tasks List and click Edit.
- Double-click on a TaskBot in the Tasks List, provided that double-click editing is enabled in the Advanced Settings for Edit Task. By default, this setting runs a TaskBot when double-clicking. For more information, see [Editing TaskBots](#).
- Create a new TaskBot in the Workbench by clicking New.

### Insert MetaBot Logic in the Workbench

If you have the necessary access privileges, create a new MetaBot Logic using any of the following ways:

- Select a MetaBot from the My MetaBots List and click Edit.
- Double-click on a MetaBot in the My MetaBots List and open a MetaBot Logic from the Logic view.
- Create a new MetaBot in the Workbench by clicking New. For more information, see [Workbench and creating Logic](#).

## Editing Multiple Commands (Bulk Edit)

To make editing automation tasks easier, Automation Anywhere provides a Bulk Edit feature, which enables you to edit multiple commands at one time. Bulk Edit works with two command types: Delays and Keystrokes.

### Prerequisite for Editing Multiple Commands

\*Available from 9.0.2

Before you Bulk Edit multiple commands it is important to ensure that all the selected commands are of the same type and enabled. Bulk Edit doesn't work if any of the selected commands is disabled.

---

You can edit either keystrokes or delay commands individually.

## Editing Multiple Delay Commands

Using Bulk Edit, you can apply the settings for a specific delay command to multiple delay commands in your task. Follow these steps:

1. In the Workbench, select multiple Delay commands in the task.
2. Right-click on one of the selected commands and select Bulk Edit from the pop-up menu.
3. In the Delay/Wait window, set values for the delay settings.
4. Click Save.

In the Task Actions List view of the task, you'll see that all of the Delay commands that were included in the Bulk Edit operation are now changed to the new settings.

## Use Case Scenarios

Set a common delay of 5 seconds to multiple Delay commands

1. Open the task in the Workbench.
2. In the Task Actions List, select (highlight) multiple Delay commands using the Control key, or use the Filter to view all of the Delay commands in the task.
3. Right-click on one of the selected commands and choose Bulk Edit.
4. In the Delay/Wait window, enter "2000" in the Delay field.
5. Click Save.

Set a common random delay for multiple Delay commands

1. Open the task in the Workbench.
2. In the Task Actions List, select (highlight) multiple Delay commands using the Control key, or use the Filter to view all of the Delay commands in the task.
3. Right-click on one of the selected commands and choose Bulk Edit.
4. In the Delay/Wait window, Select Random Delay.
5. Enter "5" in the 'From' field.
6. Enter "500" in the 'To' field.
7. Select the Delay in Seconds radio button.
8. Click Save.

## Editing Multiple Keystroke Commands

Using Bulk Edit, you can apply the settings for a specific Keystrokes command to multiple Keystrokes commands in your task. Follow these steps:

1. In the Workbench, select multiple Keystrokes commands in the task.
  2. Right-click on one of the selected commands and select Bulk Edit from the pop-up menu.
  3. In the Insert Keystrokes window, set values in the Keystrokes settings and click Save.
- In the Task Actions List view of the task, you'll see that all of the Keystrokes commands that were included in the Bulk Edit operation are now changed to the new settings.

Related reference

[Editing TaskBots](#)

[Changing Window Titles](#)

## Saving a TaskBot

You can use the Save as a text file and Save as XML file options to save a TaskBot that is in edit mode in the Task Editor. When you save the TaskBot (.atmx file) as an XML file, information such as task properties, variables, and commands are saved. However, if you save it as a text file, these are not saved.

### Save a bot as a text file

1. Click File > Save as text file.
2. Enter the filename in the Select the file field, or click Browse... to select a location of your choice using the Windows Explorer.
3. Click Save.

The file opens.

4. Verify the contents and click Save.

### Save a bot as an XML file from the Workbench

1. Click File > Save as XML file.
2. Enter a filename in the Select the file field.

If you leave it blank, it uses the task name in the default folder where the task is saved.

3. Click Open.  
Tip: Click Browse... to select a location of your choice using the Windows Explorer:
4. Click Save.
5. Click OK.

### Save a bot as an XML file from the command line

To save a bot as an XML file from the command line, you must be logged in as a bot creator.

1. Launch the command window.
2. Enter the following command to save the file to a specific location:

```
<application path> /token /<sd> or <sf>: <source directory path or source  
filename> /<dd> or <df>: <destination directory path or destination filena  
me>
```

For example:

```
C:\Program Files (x86)\Automation Anywhere 11.2\Client\AAWorkbench.exe /ex  
port /sf: C:\Server-Files\Loop.atmx /df:"D:\Task-Repository\Loop.xml"
```

3. Select one of the optional parameters.

Parameter	Description
token	Export
sf	Source file. This is mandatory
sd	Source directory. This is mandatory
df	Destination file. This is optional.
dd	Destination directory. This is optional.

The source and destination parameter type must be the same. For example, sf must be used with df.

By default, the existing file with the same name is overwritten.

## XML file structure

The XML file provides task details in three main sections:

1. Task Properties
2. Variables: each of the variables are in the <Variable> node
3. Commands: each of the commands are in the <Command> node

## Saving as, Copying, and Adding a New Task when Version Control is enabled

If you use Save As, Copy, or New to provide a new filename using any of the options, you can add unique names only in the respective folder in which it is created. You cannot add an existing filename.

### 11.3.3

## Saving a protected bot

The File -> Save As option is disabled to protect the Intellectual Property (IP) rights of the original creator of the Digital Worker or bot.

You cannot save the protected bot as an XML file from the command line.

## Deleting a TaskBot

As a Bot Creator with access privileges to particular folders, you might want to delete an existing automation TaskBot.

After deleting a TaskBot, you cannot restore the TaskBot on the Enterprise client. Before deleting a TaskBot, be sure you no longer have use for that TaskBot.

### Delete TaskBot

To delete a TaskBot, follow these steps:

1. In the My Task List, select the TaskBot.
2. Delete the TaskBot using one of the following methods:
  - In the Edit menu, select Delete.
  - In the Actions button, select Delete from the drop-down list.
  - Right-click on the TaskBot and select Delete.
3. In the Delete Task? window, click Yes.

The TaskBot is removed from the Task List view.

### Delete from the server

To delete a TaskBot from the server, follow these steps:

1. Go to Manage > Repository.
2. Select the TaskBot(s) from the Server Repository.
3. Click Delete.

The TaskBot is removed from the Server Repository > My Tasks list view.

As a best practice, be sure that all tasks are copied to the server as a way of backing up your automation projects. If a deleted TaskBot was copied to the server, you can restore it by copying the server version to the Enterprise client.

### Deleting a file or folder if Version Control is enabled

- Deleting a file from the local repository: If you have version control enabled, while deleting a TaskBot or a file from the Enterprise client, apart from confirmation, you will be notified that the TaskBot will be deleted locally only.
- Deleting a file from the server repository: To delete a TaskBot from the server repository, you will have to select it from the relevant folder of the repository.
  - Scheduled bot (Task/File): To delete a bot that is scheduled to run, you must remove it from the schedule.
  - Dependent bot (Task/File): To delete a task that is listed as dependent on some other TaskBot, you must first remove the dependency from the Enterprise client. You can then upload the TaskBot to the server again to ensure it is not being used as dependency.
- Deleting a Folder: You can delete a folder from the local repository only. The Delete Folder option is disabled if it comprises a TaskBot that has been checked out for edit.

#### Related reference

## Create a bot

Learn about all the tools necessary for enhancing, streamlining, and deploying automated processes.

The Create a TaskBot editor provides hundreds of commands to create automated processes.

### Task Editor components

The Task Editor provides the following user interface components:

- Drag and drop Commands panel
- Task Actions List in Design view, Code view, or both.
- Action buttons
- Variable Manager panels
- Filters
- Search capabilities

### Using Commands panel

The left panel contains all of the Automation Anywhere supported automation process commands to build and enhance automation tasks. Drag and drop these commands into the Lines panel, move commands, and edit commands in bulk, if required.

### Using actions buttons

These involve actions for creating a new task, a new folder, recording a task, running the current task that is open in the editor, saving the task, enabling debugging, and for specific commands:

- New button to create a new task
- Record button to start recording in the current task  
Your mouse click and keystroke actions are recorded with the Recorder.  
Note: The recorded actions are saved as Object Cloning commands.
- Run button to run the current task
- Save button to save the current task

### Using dependencies view and Variable Manager

The Variable Manager panel is useful when using multiple variables in your tasks. The Variable Manager shows the local variables that are defined by the user for a specific task. Use the Variable Manager to add, modify, and copy variables in automation tasks.

### Using filters

You can use the Filters bar to manage long tasks. When selecting these check boxes, the commands are made visible in the Task Actions List. Using these filters can make isolating problems and viewing specific commands easier.

## Editing a task using the keyboard

If you prefer not to use the mouse to drag and drop commands, Automation Anywhere makes it possible to insert commands in your task by using keyboard strokes. The Commands panel supports using Arrows, Tabs, and Enter keys.

To open command windows, press Enter and complete the steps to specify the command parameters.

This capability is useful for people who prefer to use quick keyboard shortcuts.

Tip: Type the first letter of a command to highlight it and ease navigation to that command. For example, typing the letter "e" highlights the Email Automation command.

- [Editing TaskBots](#)

Edit TaskBot Logic using the Workbench to add, modify, or delete actions and steps.

- [Using the task Actions List](#)

The task Actions List is the main workspace for building your automation tasks.

- [Using filters in the Workbench](#)

By default, automated tasks are shown in the Automation Anywhere Workbench with all commands and actions in chronological order (sorted by time).

- [Manage bot dependencies](#)

As a Bot Creator, you can manage TaskBot-dependent files. You can ship all dependent files, for example, DOC, DOCX, XLS, XLSX, CSV, MDB, PKX, ATMX, EXE, PDF, TXT, JPG, PNG, BMP, and XML with the TaskBot.

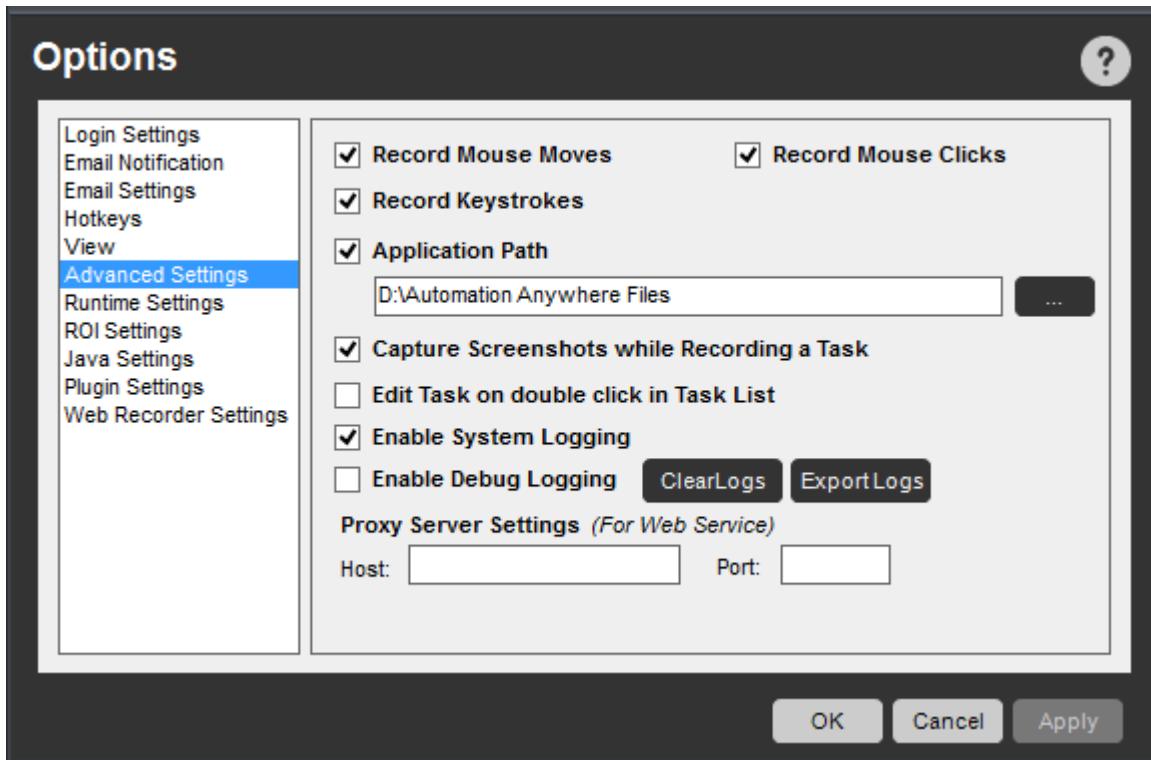
## Editing TaskBots

Edit TaskBot Logic using the Workbench to add, modify, or delete actions and steps.

1. Open a task in the [Workbench](#) in one of the following ways:
2. Select the task and click Edit. The edit button is a pencil icon.
3. Right-click the task and select Edit.
4. Click Actions and select Edit.

To edit a task when double-clicking it, change the setting by following these steps:

1. In the main Automation Anywhere window, click Tools > Options.
2. Click Advanced Settings.



3. Check the "Edit Task on double click in Task List" check box.

## Editing task when Version Control is enabled

The editing of a task and its properties varies, depending on the status of the task when Version Control is enabled.

- If the task file is not checked out, it opens only in View Only mode.

Also, the Properties tab is disabled for editing and states `Check out the file to enable editing the Properties.`

- After the task file is checked out, users can edit the task and its properties.

- [Editing a Web-only Task with Web Recorder Commands](#)

You can use the Workbench to edit and enhance the automation tasks that you earlier recorded using the Web Recorder.

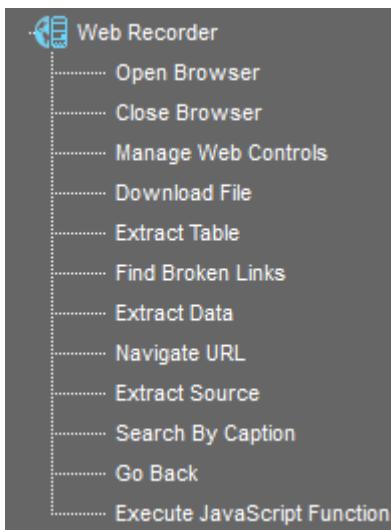
## Editing a Web-only Task with Web Recorder Commands

You can use the Workbench to edit and enhance the automation tasks that you earlier recorded using the Web Recorder.

When you launch the Workbench, you can add any of the commands that are listed under "Web Recorder".

Using the Web Recorder commands, you can:

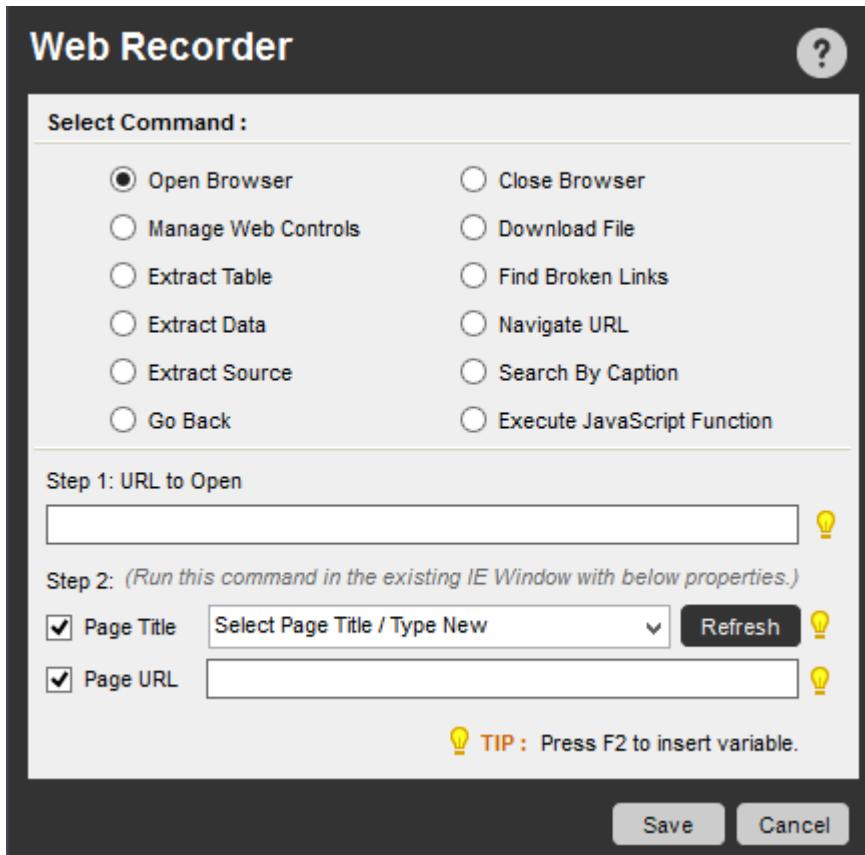
- Open and close websites in browser sessions
- Manage web controls
- Download data
- Extract tables
- Test websites and locate broken links
- Extract data
- Navigate URLs
- Extract Website source code
- Search by captions
- Navigate back
- Execute a java script



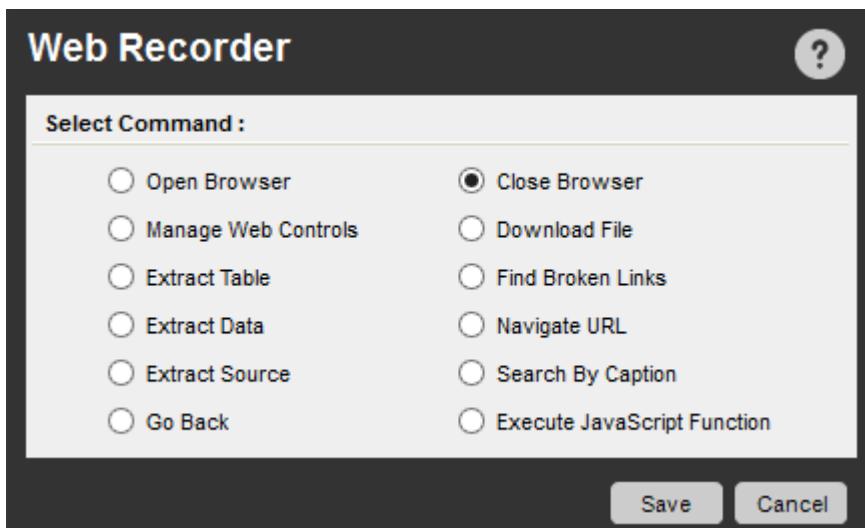
You can add the following actions to your Web Recorder automation task.

## 1. Open and Close Browser Sessions

- Open Browser: You can specify a website URL that you want the automation task to open prior to performing actions on that website. For most processes website automation, opening the browser is the first command added to the task, usually followed by commands that manage controls.

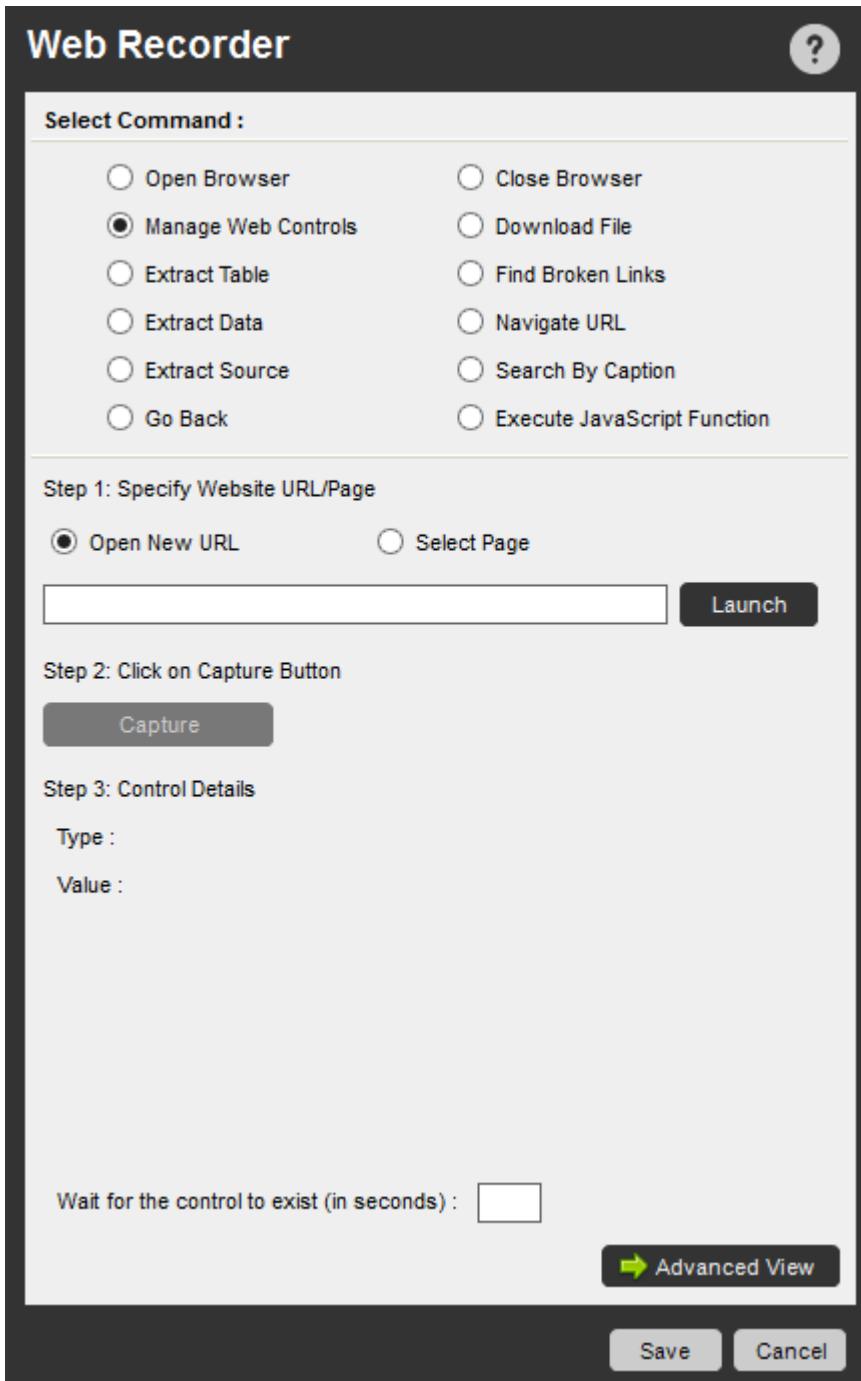


- Close Browser: Closes an open browser session that was previously opened using an Open Browser command.



## 2. Manage Web Controls

Use the Manage Web Controls command to select controls on the web page and work with them.



For example, you can insert actions on links, check boxes, radio buttons, drop-down menus, and other objects.

To use Manage Web Controls, follow these steps:

1. In 'Specify a Website URL/Page' choose either 'Open New URL' or 'Select Page' .

If you specify 'Select Page' you are required to select a page title (html page) that is open, from the list.  
Tip: Click 'Refresh' if window is open, yet not visible.

2. Use the Capture button to capture a web control by selecting it with the yellow prompt bar: The control details are displayed.
3. Click the Advanced View button if you wish to include more options.
  - Control Name / Control ID: Searches for the web control based on the control name or ID.
  - Caption: Searches for the web control based on the caption name that is entered or selected from the text box. For example, if you record a menu object with a caption titled "Buy Now", this web control lets you search the web page for this caption when the task runs.
  - Control Index: Searches for the web control based on the index number of the control, which is stored while recording a web page.
  - Attributes: Searches for the web control based on the tag attributes, which are stored while recording a web page. You can select the tag attributes and specify their values for the web page that is being searched.

You can add or delete tag attributes, as required.

-  Tip: Best Practice is to use 'Search by Caption' as the first option, 'Search by Attributes' as second option, and 'Search by Index' as the third option.

4. Enable or disable 'Page Title' and/or 'Page URL' to decide whether to play in existing or new Internet Explorer window.

Note: Both are enabled by default and the task will play in existing Internet Explorer window.

5. Specify the action that you wish to perform during task play time.

Tip:

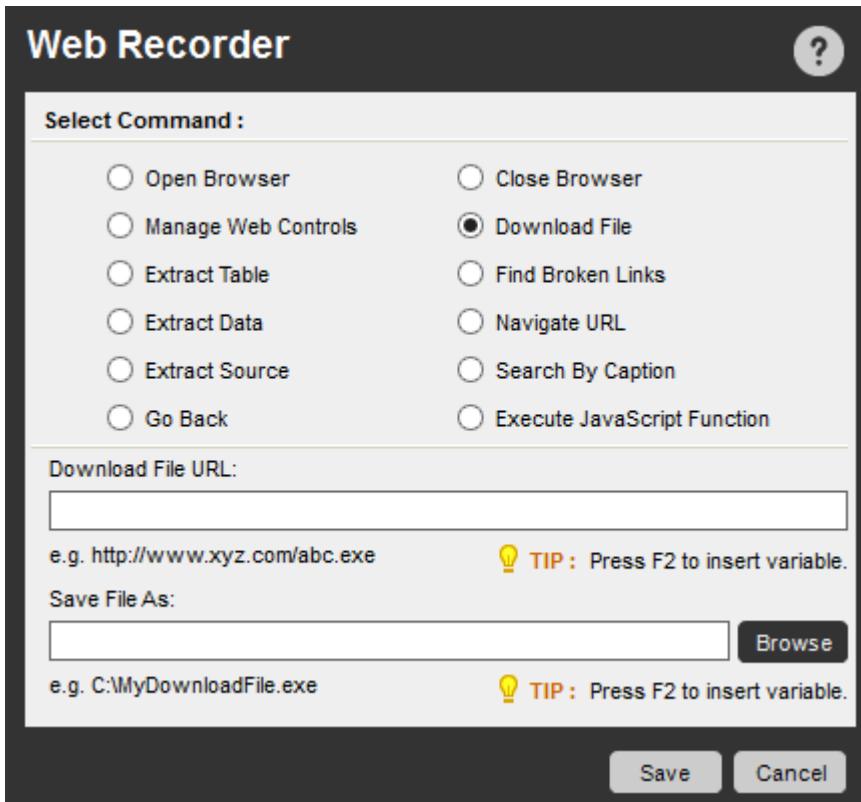
You can opt to use a Variable while using the actions Set Text and Append Text. If the text needs to be encrypted, you can insert Credential Variables\* using function key 'F2' for enhanced security. Refer to [Credential variables](#)

\*Available in Enterprise edition from version 10.3

6. Click Save.

### 3. Download File

Use this command to download HTTP files. This command does not require a browser.



Common Use Cases: Downloading stock data, log files, security patches, or other files that you routinely need to download.

#### 4. Extract Table

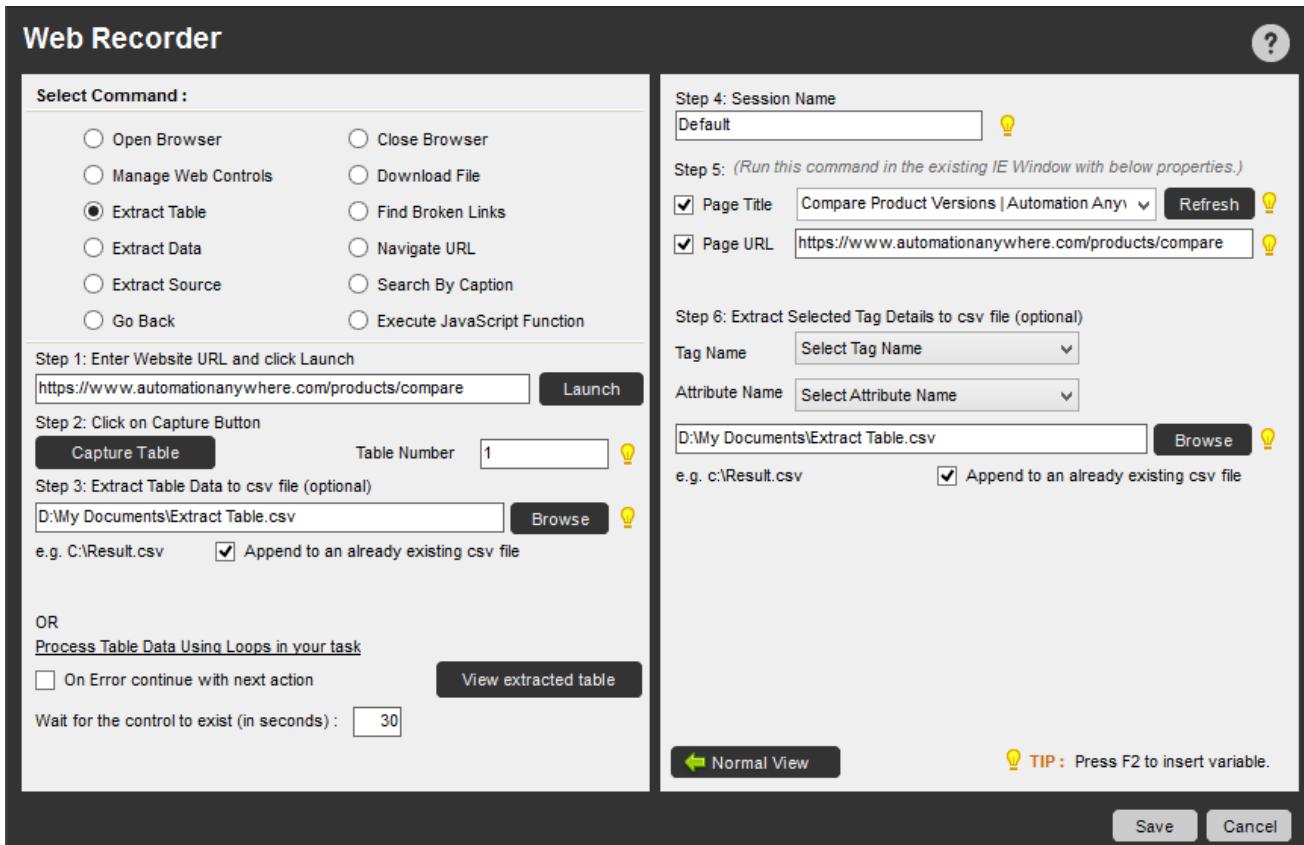
Use this command to select a table on a web page and save the data to a CSV file.

After running the task, including the Extract Table command, Automation Anywhere stores the table data in a system variable named: \$Table Column(index)\$

You can use this variable to retrieve the data that you extracted in row-and-column format by using a combination of Loops for each row in an Internet Explorer table.

Common Use Case: Transfer data from a web-based ERP system to another application, such as Excel.

Follow these steps to extract table from a website:



1. Select Extract Table
2. Launch the website you wish to extract the table from by clicking on 'Launch'.
3. Use the 'Capture Table' button to capture the table by selecting it with the yellow prompt bar:

**Click on the table you want to extract from the page. Press 'Esc' to cancel and continue recording.**

The program will display the table number.

4. You can optionally save or append the table data to a .csv file. Or you can process the table data using loops within your task. Refer Loop Command for details.
5. Click on View extracted table button to preview the table data in the Extracted Table window:

**Extracted Table**

Preview (Up to 50 rows)

Sr. No.	Column1	Column2	Column3	Column4	Column5
1	Feature	Standard	Premier	Small Business	Enterprise
2		\$995	\$2,995	\$8,000	Call 1-888-48
3		For individuals a...	For individuals lo...	For teams lookin...	For compani
4	Record				
5	Task Editor				
6	Web Recorder				
7	Scheduler				
8	FTP/SFTP				
9	Multi task editing				
10	Excel Integration				
11	Web Data Extrac...	Limited			

< >

Cancel

- Click the Advanced View button to add more options such as Session Name, Page Title, Page URL, Extract selected Tag Details to a .csv file

 Advanced View

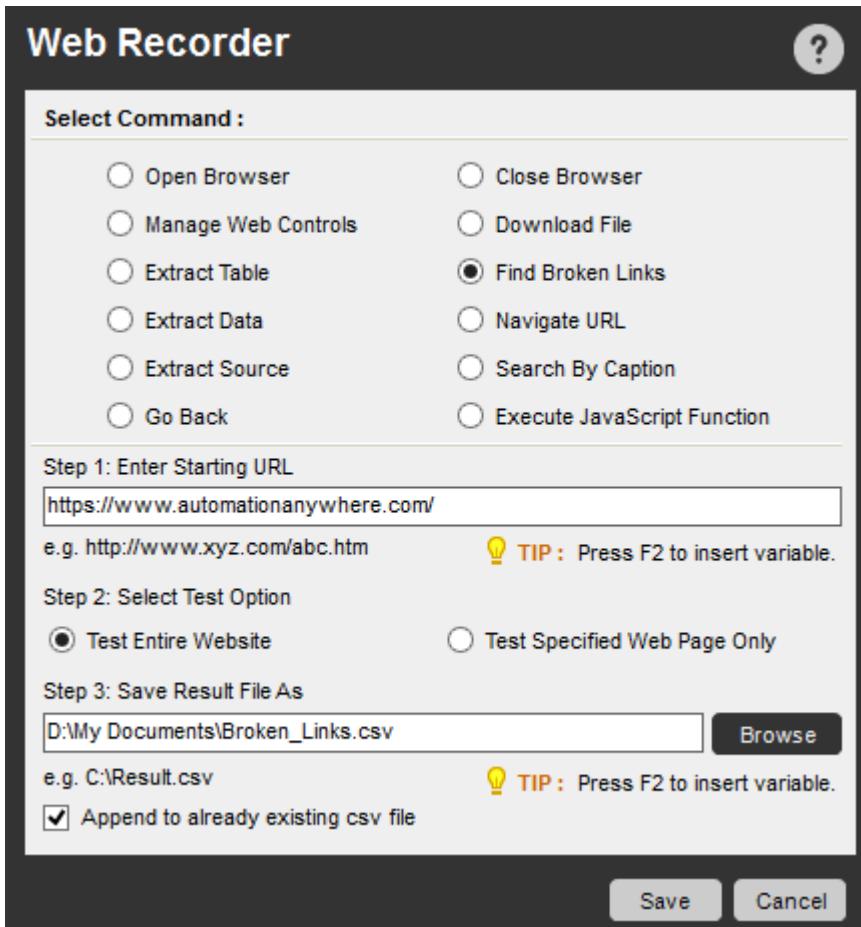
- Click Save

## 5. Find Broken Links

Use this command to validate all links on a website or a web page.

After running the command, Automation Anywhere stores the results in a CSV file that you can open in Excel.

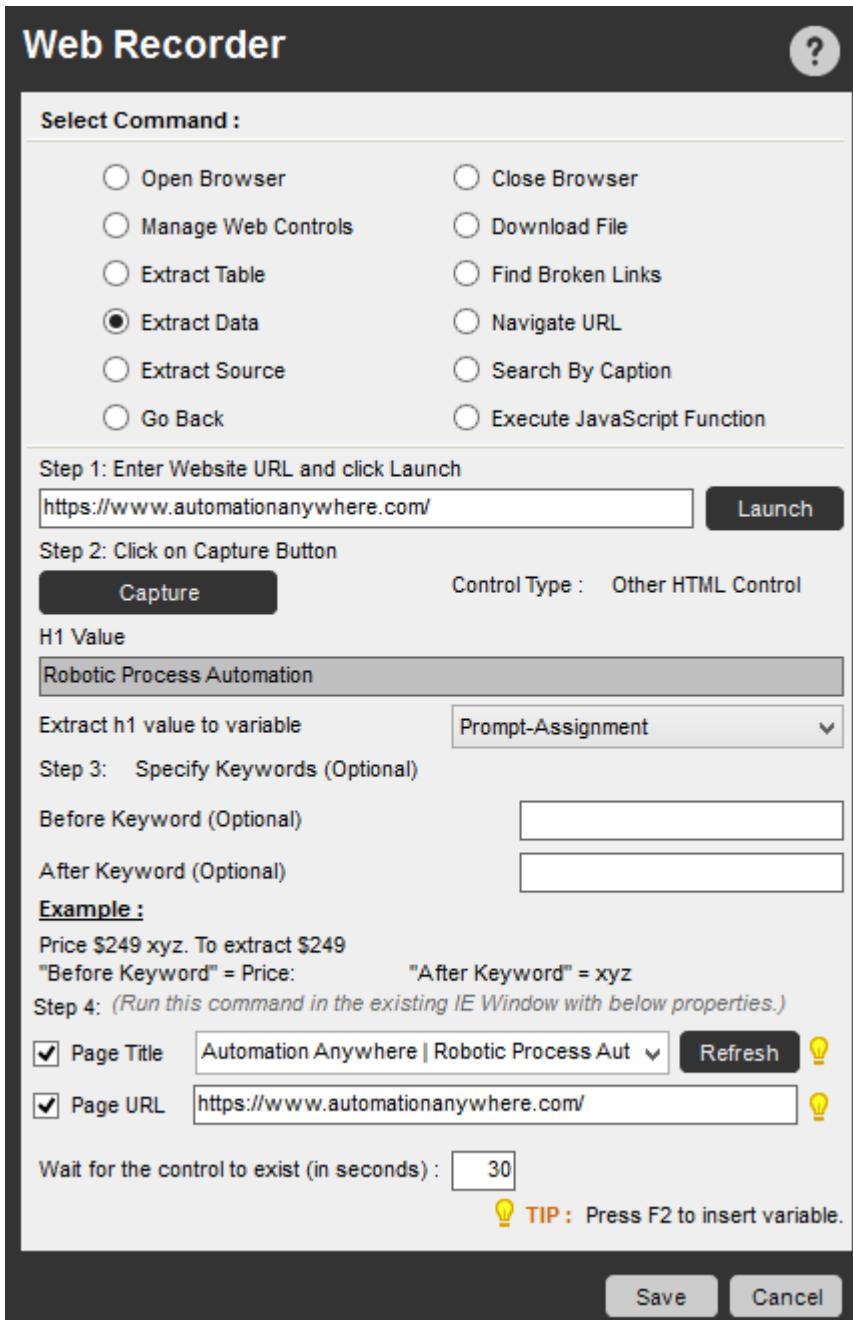
Using this file, you can identify any broken links.



## 6. Extract Data

Extracts text data from a website or a web page.

This command enables you to specify a range of text that you want to copy, using "Before" and "After" keywords.



Example: Given the text string "= Price: \$249 xyz"

You want to capture only the price, which is \$249. Specify the following range:

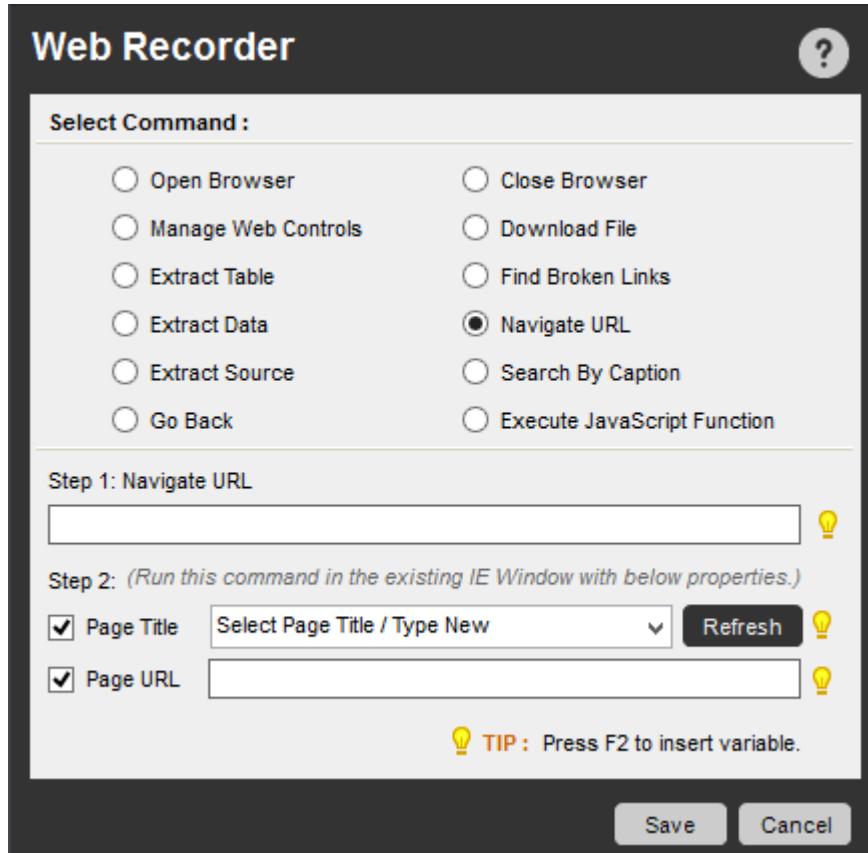
Before keyword: "= Price:"

After keyword: "xyz"

Tip: In some cases, the Extract Data command might skip extracting some records. If this occurs, select "First and Last record" while capturing pattern-based data. For extensive pattern-based data extraction, use the Web Recorder.

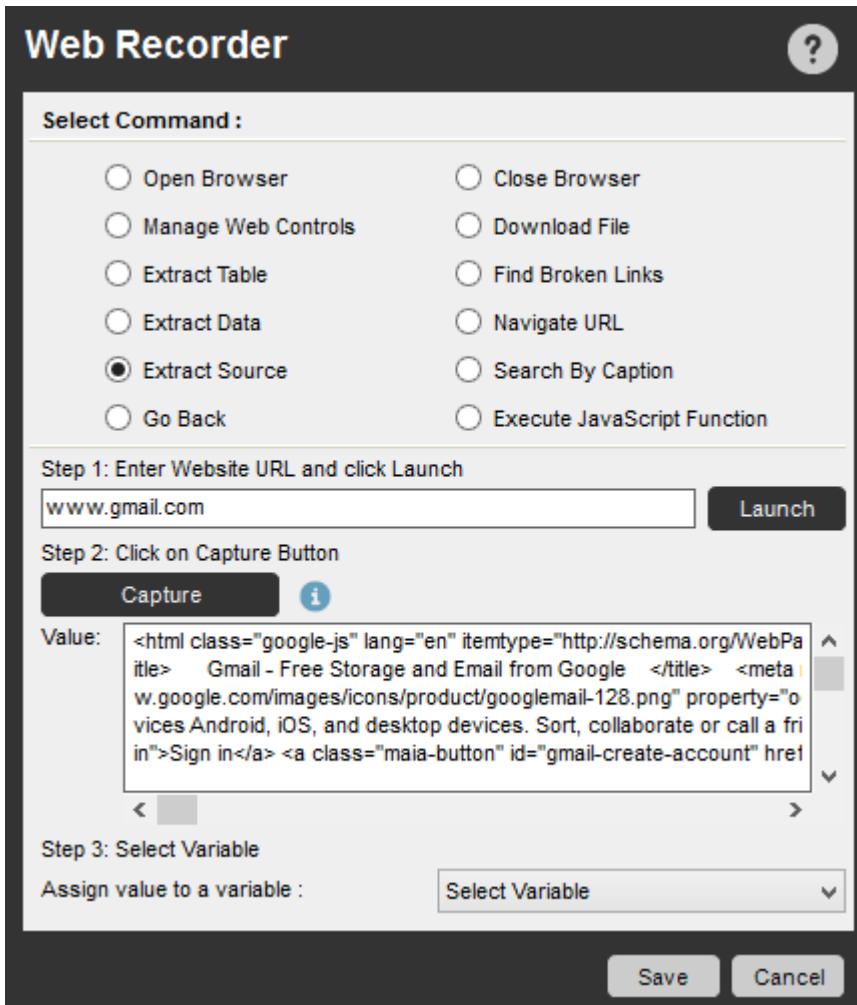
## 7. Navigate URL

Use this command to navigate to a website URL in a browser window that is already open.



## 8. Extract Source

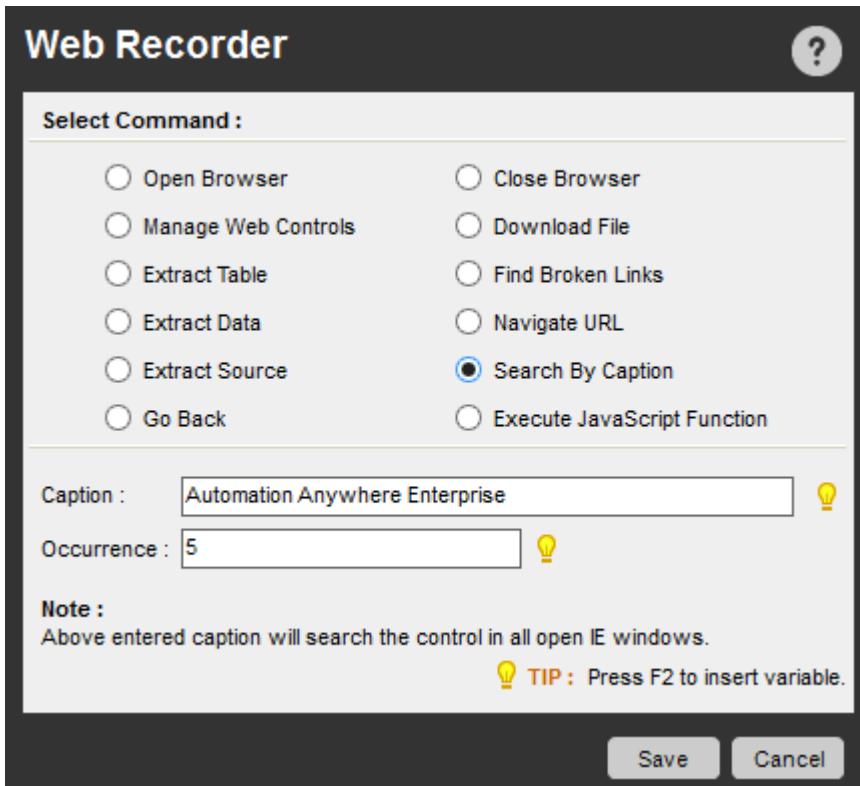
Use this command to extract source code from a web page.



Tip: Capture' button disabled? Refer the section on Web Recorder in [Troubleshooting Excel Command Tasks](#) for details.

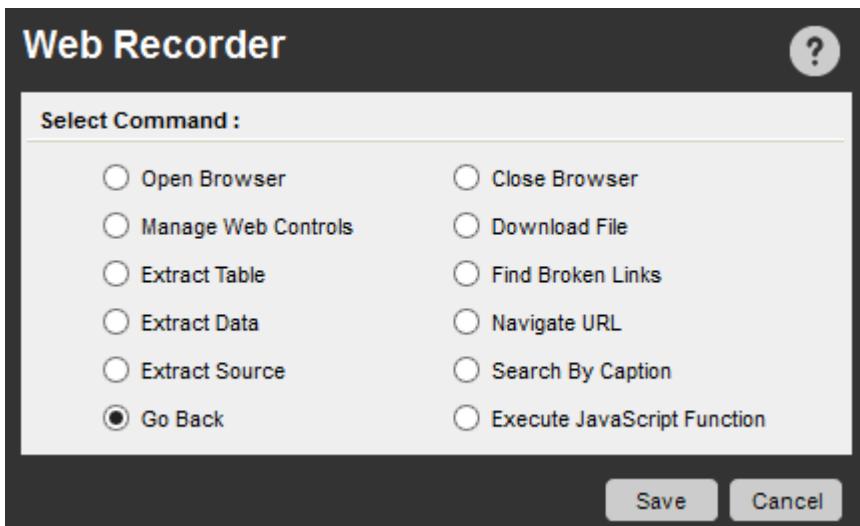
## 9. Search by Caption

Use this command to navigate to a caption or title in a browser window that is already open. Navigation using this command is possible even if URLs change.



## 10. Go Back

Use this command to navigate to the previous URL location that was used during website recording.

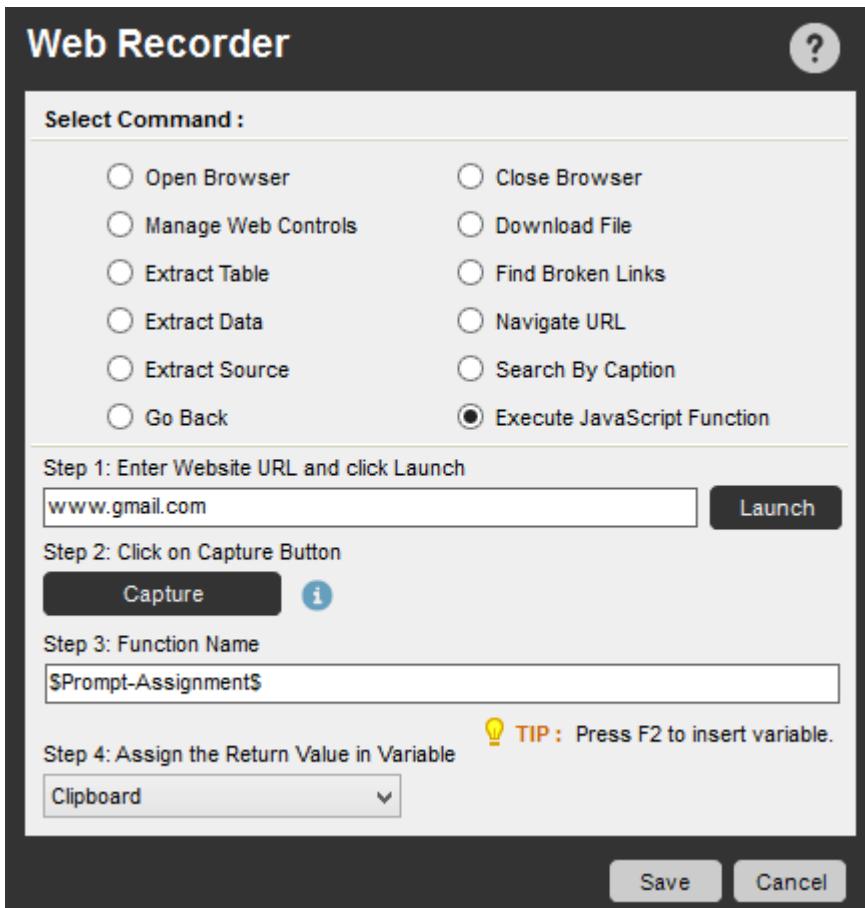


## 11. Execute Java Script

Use this command to execute Java Script internally on a web page.

Note:

It is mandatory to enter the 'Function Name' without which the specific script named therein will not be executed.



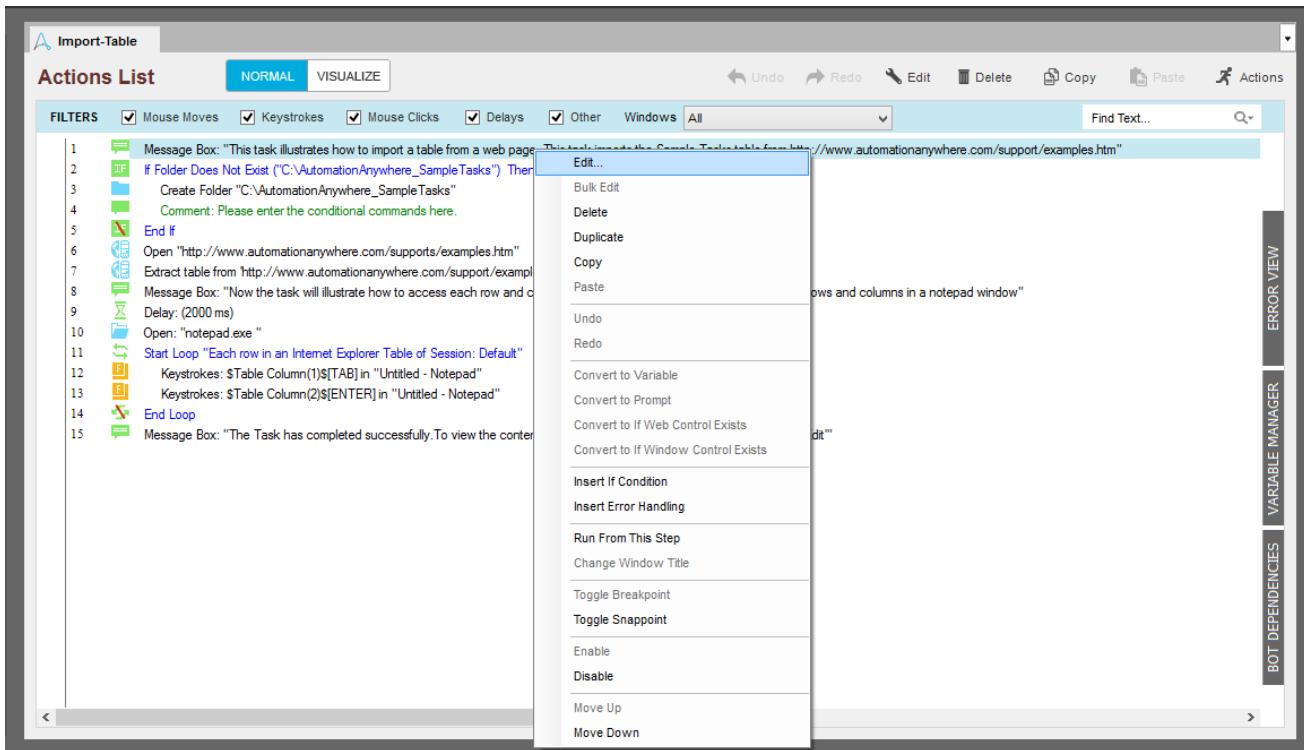
- Ensure JavaScript has been enabled for Internet Explorer. If disabled, you may receive an access denied message. For details refer the [Microsoft Support](#) section.
- 'Capture' button disabled? Refer the section on Web Recorder in [Troubleshooting Excel Command Tasks](#) for details.

#### Related reference

[Using the Web Recorder](#)  
[Extracting Regular Web Data](#)  
[Extracting Pattern-Based Data](#)  
[Extracting Table Data](#)

## Using the task Actions List

The task Actions List is the main workspace for building your automation tasks.



You can insert commands by dragging them from the Commands list. After you insert commands, you can modify them using the following options:

1. To edit the parameters (settings) for a command, double-click the command.
2. To take action on the command, such as copying it, right-click the command to view the options.
3. The Task Actions List bar provides buttons for manipulating commands. The following options are available:
  - Edit: Opens the command settings window to enable you to edit them.
  - Delete: Removes the command from the Actions List.
  - Copy: Copies a command for use in another location of the task.
  - Paste: Pastes a copied command at the location below the cursor.
  - Actions: Click the Actions button to select one of the following actions :
    - a) Bulk Edit: Make changes to multiple Delay or Keystroke commands simultaneously.
    - b) Duplicate: Duplicate a command in the location below the selected command.
    - c) Convert to Variable: Convert a Keystroke command to a variable.
    - d) Convert to Prompt: Convert a Keystroke command to a prompt message.
    - e) Convert to if Web Control Exists: Runs the command if the specified Web control exists.
    - f) Convert If Windows Control Exists: Runs the command if the specified Windows control exists.
    - g) Insert If Condition: Inserts an IF condition for a selected block of commands.
    - h) Insert Error Handling: Inserts an Error Handling command for a selected block of commands.
    - i) Change Window Title: Change the name of a window title to one or more application windows.
    - j) Run from this Step: Runs the task when encountering this command.
    - k) Enable: Activates a command.
    - l) Disable: Disables a command.
    - m) Move Up: Moves a command up in the Task Action List.

n) Move Down: Moves a command down in the Task Action List.

Related reference

[Using the Workbench](#)

[Using filters in the Workbench](#)

## Using filters in the Workbench

By default, automated tasks are shown in the Automation Anywhere Workbench with all commands and actions in chronological order (sorted by time).

### Using command filters

Filters enable you to customize your view. Filters are particularly helpful when working with larger automations.

Filters do not modify a task. Filters enable you to focus on specific commands in an automation without needing to modify the entire TaskBot.

To view or hide specific commands in a task, select or deselect the filters in the Filter Bar in the task Actions List.

- Select CATEGORIES to view category folders that contain the commands.
- Select VIEW ALL all of the commands in alphabetical order.

### Using the Find Text search field

Use the Find Text search field to search in a task for names, text, variables, and other items. This can be helpful when editing longer tasks.

### Using the Windows filter

Use the Windows filter for tasks that involve two or more applications, for example, the Calculator, Notepad, and Explorer. Use the Windows filter to view actions sorted by application.

In the drop-down list, select ALL, NONE, or the application title to view the related commands.

Related reference

[Using the task Actions List](#)

## Manage bot dependencies

As a Bot Creator, you can manage TaskBot-dependent files. You can ship all dependent files, for example, DOC, DOCX, XLS, XLSX, CSV, MDB, PKX, ATMX, EXE, PDF, TXT, JPG, PNG, BMP, and XML with the TaskBot.

These are automatically uploaded to the Enterprise Control Room and deployed when running the TaskBot.

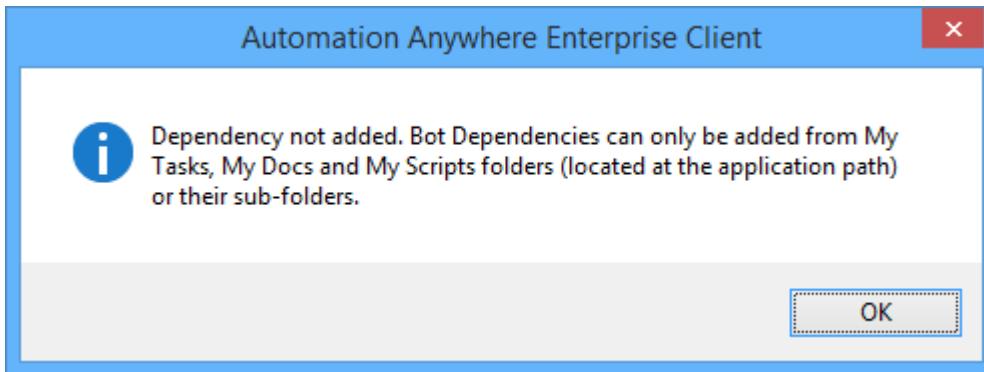
## Manage bot-dependent files

You can use the Bot Dependencies option from the Workbench to manage the dependent files. Here, you can add, copy/copy all, and delete files from the My Tasks, My Docs, and My Scripts folders.



To reference (include) the file in that specific task, use the System Variable \$AAApplicationPath\$.

The dependent files can be added only if they reside in the My Tasks, My Docs, and My Scripts folders. If you choose any other source, the following error appears:



## Add a dependent file

To add a dependent file to your bot from the Bot Dependencies panel, do the following:

1. Click Add.
2. Select the required files from the My Tasks, My Docs, or My Scripts folders/subfolders.
3. Click Open.

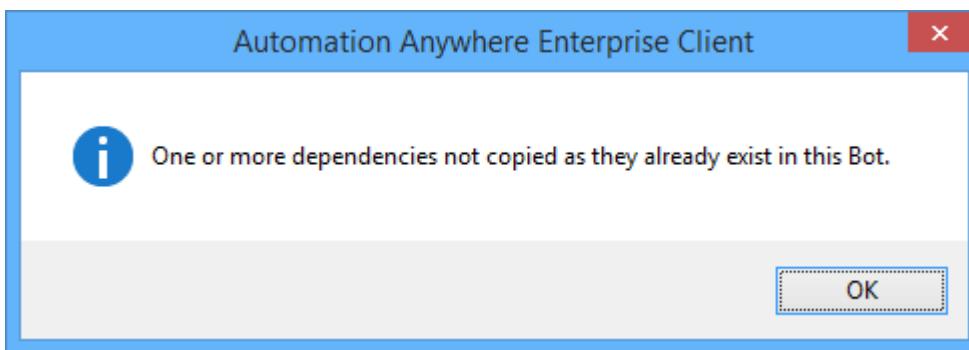
The dependent files are added and listed under Bot Dependencies:

## Copy or copy all dependent files and paste

To copy/copy all files from your bot to another bot from the Bot Dependencies panel, do the following:

1. Select the required file(s) listed under Bot Dependencies
2. Click Copy/Copy All.
3. Create/Open the bot where you want to copy the dependent files.
4. Click Paste. The dependent files are copied and listed under Bot Dependencies.

Note: If the dependent file is already in the bot, it is not copied and an error message appears :



## Delete a file

To delete a dependent file in your bot from the Bot Dependencies panel, do the following:

1. Select the file.
2. Click Delete and confirm that the file is removed from the list of dependent files.

## Reference dependent file in bot

To reference (include) the file in the bot, do the following:

1. Drag and drop the required command in the task Actions List.

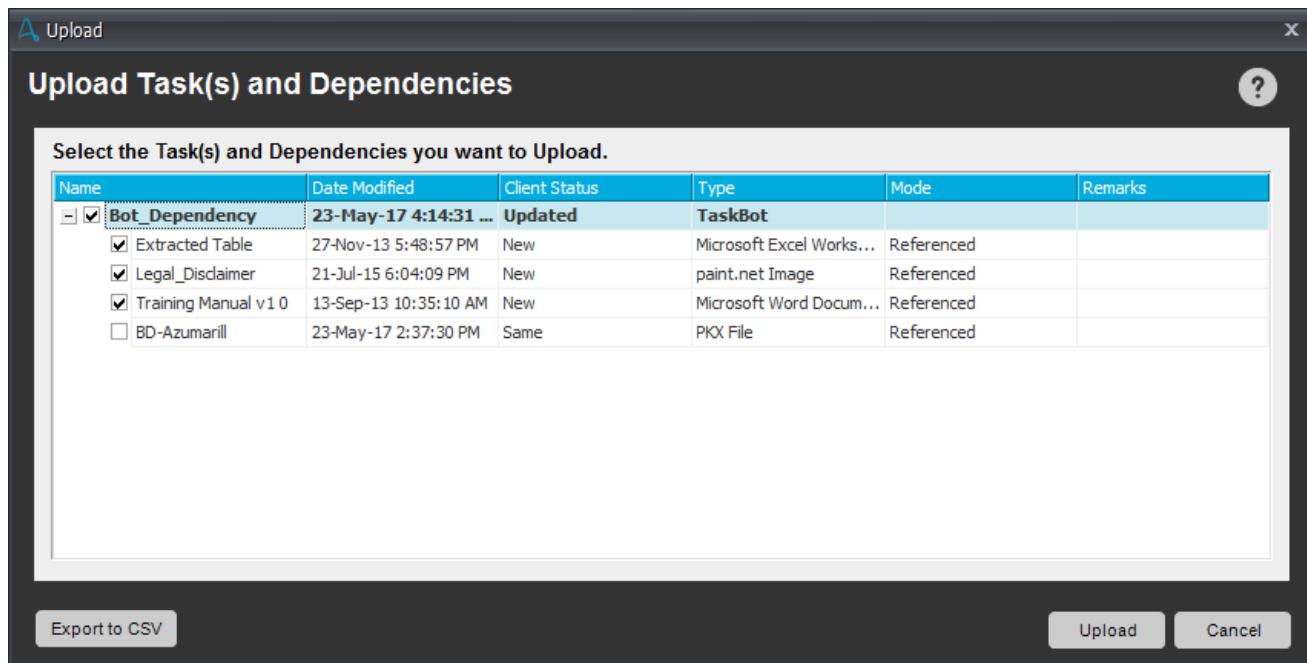
2. Select the dependent file.

Tip: If the task will be uploaded for use by other users, use the System Variable \$AAApplicationPath\$ .

## Upload or download dependent files

All dependent files are automatically uploaded to or downloaded from the Enterprise Control Room.

[Uploading and downloading bots, workflows, and dependencies](#)



## Scheduling Tasks to Run

After creating an automated task, you can schedule the tasks to run based on a schedule or on a trigger event.

Select Sample Tasks > File Name > Schedule > Launch Task > Please Select a Schedule.

Note: In Enterprise editions 10.0 & 10.1, Bot Creators - Client users with task creation privileges can only test run the tasks using the 'One Time Only' schedule option. However, Bot Runners - Client users with run time privileges, can continue to schedule tasks using various options if using Enterprise edition 10.2. and above. Refer to [Scheduling Tasks in Bot Creator or Bot Runner](#).

## Scheduling Tasks

Automation Anywhere provides a Scheduler and a Schedule Manager that you can use to run your tasks anytime you want.

### Scheduling Tasks Using the Scheduler

The Automation Anywhere Scheduler provides time-based scheduling capabilities. You can schedule tasks to run on particular days, weeks, or months of the year.

For more information on the Scheduler, see [Schedule](#).

### Viewing Task Schedules Using the Schedule Manager

The Schedule Manager enables you to view, add, or edit the schedules of tasks that you have created.

For more information on the Schedule Manager, see [Using the Schedule Manager](#).

### Scheduling Tasks Using Triggers

To run a task based on a trigger event, use the Trigger tab on main Automation Anywhere window.

Some examples of events that can trigger a task to run include when:

- A new window opens
- A specific file is created
- A file is deleted
- An email is received in a particular in-box

For more information about using triggers, see [Using the Trigger Manager](#)

### Scheduling Tasks to Use Auto-Login

You can enable the Auto-Login option when you schedule a task to run.

1. Select Tools > Options > Auto Login.
2. Select the check box Auto Login your computer when the task runs. This enables applying Auto Login to all of your tasks.
3. Select a task and go to the Schedule tab.
4. Enter the required parameters and click Save:
5. Enter the username and password in the Schedule Task window. Click Save. Optionally, click Always use above credentials to schedule and run tasks and/or Enable Auto Login.

Refer [Scheduling Tasks to Run](#) for details.

- To turn off Auto-Login, click Tools > Options. Under the Auto Login option, deselect the Enable Auto-Login your computer when the task runs check box.
- If an error occurs while a task is running, Automation Anywhere returns the computer to its previous state, regardless of other tasks waiting to process.

Note: Do not use interactive commands (commands that prompt a user for input) for tasks that use the Auto-Login feature.

## Enabling Bypass Legal Disclaimer \*

The feature is available for use, when you select Auto Login your computer when the task runs option. If you wish to bypass the security measures and automatically log on, enable Bypass legal disclaimer.

Important: Please note that this feature should be used with utmost care before enabling. The sole responsibility of using this feature lies with the user and Automation Anywhere is not liable for its misuse and/or related consequences.

- [Best practices for running tasks](#)

Follow these suggested best practices to run tasks.

- [Using the Schedule Manager](#)

Use the Schedule Manager, to view, add, or edit any of your task schedules.

- [Scheduling Tasks in Bot Creator or Bot Runner](#)

The Automation Anywhere Scheduler enables Development Clients to schedule automated tasks once to run at preferred times, without requiring supervision or intervention.

- [Using the Trigger Manager](#)

Use the Trigger Manager to display, add, modify, and delete triggers you have set for your tasks.

- [Calling Tasks from Programs or Scripts](#)

- [Uploading - Pending Changes or Files](#)

As a Bot Creator with access privileges to particular folders, you can upload files from folders to the server using different options if Version Control is enabled in Control Room.

- [Uploading and downloading bots, workflows, and dependencies](#)

Use the Enterprise client to upload and download TaskBots, Master Bots, MetaBots, and Workflows with any related dependencies to and from the Repository.

- [Viewing Version History](#)

Use Version History to view the history of updates to the selected file. Also compare and roll back updates, if required.

- [Troubleshooting Scheduled Tasks](#)

If a scheduled task fails to run using the scheduler, follow these steps to resolve the problem:

Related reference

[Create an automated task](#)

[Setting Task Properties](#)

## Best practices for running tasks

Follow these suggested best practices to run tasks.

### Best Practices for Running a Recorded Task

Use Open Program and Open File commands from the Workbench to open applications

When using the standard recorder to record windows operations, you may experience errors when running the task if the application is not open. To avoid this, edit the task from the Workbench to add Open Program and Open File commands.

Use the Workbench command If Window Exists to check for the window before attempting to open it

This command prevents the possibility of an application not opening properly. You can find the command under other If conditions in the Workbench.

#### If Window Exists

Use the If Window Exists command in combination with the Open Program and Open Filecommands to launch particular applications.

#### Wait for Window

Use the Delay Wait for Window command to wait, continue with the next action, or stop the task if the window is not present.

If you do not want to use Workbench commands to open programs or files, ensure that applications necessary to run the task are open prior to running the task

Most of the commands in the standard recorder are based on mouse clicks and keyboard keystrokes. Therefore, you must ensure that application windows used in the process are already open before running the task, or you have added the appropriate commands to open the application windows in the task.

#### Avoid moving the mouse and keyboard

The standard recorder uses the mouse and keyboard while running a recorded task. If you use the mouse and keyboard at the same time, errors occur. You can track the progress of your running task by using the progress window displayed at the bottom of the screen.

#### Use wild cards

Specify wild cards (\*) for the Image Recognition, Window Exists, and Window Does Not Exist commands.

#### Related tasks

[Record a task](#)

Related reference

[Run a task](#)

[Editing TaskBots](#)

[Best practices for recording tasks](#)

[Using the Workbench](#)

[Commands](#)

## Using the Schedule Manager

Use the Schedule Manager, to view, add, or edit any of your task schedules.

The Automation Anywhere Schedule Manager is a convenient facility that displays all task schedules that are set for your tasks.

### Viewing Task Schedules

To view your task schedules, launch the Schedule Manager in one of the following ways:

- In the main Automation Anywhere window, click on the Schedule Manager tab on the lower left side.
- Or click Tools > Schedule Manager on the menu bar.

Note: Schedules not visible after upgrade? Reference '[Troubleshooting Excel Command Tasks](#)'.

### Creating, Editing, and Deleting Task Schedules

You can manage all of your task schedules by using the tabs in Schedule Manager:

- Date and Time tab
- System tab

## Date and Time Schedules

Within the Date and Time tab, you can use the Day, Week, and Month tabs to work with scheduled tasks.

You can add, edit, or delete scheduled task to run by using any of these views:

- Day: The Day view displays the time and description for each scheduled task. You can add, edit, or delete scheduled tasks. Use this if you need to run your tasks daily and with more frequency.
- Week: The Week view displays the date and time of scheduled tasks for the week, and includes a description. Use this option when you wish to schedule to run your task on a weekly basis.
- Month: The Month view displays the date and description of scheduled tasks for the month. Use this option when the frequency of running your tasks could be scheduled monthly.
- Date Range: In the Select Date section on the left, you can specify a date range for scheduled tasks by clicking and holding the mouse button on a start date and dragging it to the end date, highlighting the range. The Month view automatically opens to display scheduled tasks within that date range. Adding, Editing and Deleting Schedules

You can add, edit and delete schedules for tasks on your Client machine using various options:

- Daily (for example, every day, only weekdays, or every 2 days)
- Weekly (specific days of the week; for example, Mondays)
- Monthly (specific days of the month; for example, January 1 and October 5)
- One time only

To add a schedule, click Add, select the required options, and Save.

To edit a schedule, select the schedule and click Edit or double click or context click and select Edit. Additional actions include Delete and Add a schedule.

## System Command Schedules

Use the System Tab to view tasks that are scheduled to run based on system events, such as triggers.

Use this view, to add, edit, or delete task schedules that use triggers to initiate a run.

The following system triggers are available from the Schedule Task pull-down menu:

- When My Computer Starts
- When I Log On

To add a System event schedule, click Add, select the required options, and Save.

To edit a schedule, select the schedule and click Edit or double click or context click and select Edit. Additional actions include Delete and Add a schedule.

## Changing the Filter View of Task Schedules

To change the view of scheduled tasks click Change Filter located on the extreme right of the systems tab in the Schedule Manager.

Select tasks to view by taking one of the following actions:

- Browse to the required file or folder, and select the task.
- Select multiple tasks by holding the Control (Ctrl) key and selecting the tasks.
- Select All to view all scheduled tasks for the system.

Related reference

[Scheduling Tasks to Run](#)

## Scheduling Tasks in Bot Creator or Bot Runner

The Automation Anywhere Scheduler enables Development Clients to schedule automated tasks once to run at preferred times, without requiring supervision or intervention.

It is important to note that Bot Creators - Client users with task creation privileges and Bot Runners - Client users with run time privileges, can only test run the tasks using the 'One Time Only' schedule option. However, the Bot Runners can continue to schedule tasks using various options if using Enterprise edition 10.2.

To run a scheduled task on a Bot Runner, the Enterprise Control Room Administrator can create a schedule using Tasks Schedule console in Enterprise Control Room.

Note: If you have already saved Windows Login Credentials in Login Settings option, then Scheduler will not prompt you to input the credentials again.

## Scheduling Tasks

A. Bot Creators i.e. Clients with Development privileges can schedule an automated task to run for 'One Time Only' as shown below:

1. Select the task that you want to schedule.
2. Click the Schedule tab.
3. Select 'One Time Only' option from a drop down.
4. Set the scheduling information for time and date.
5. Click on Save.
6. Provide your Windows username and password.

B. Bot Runners i.e. Clients with only run-time privileges can schedule tasks using various options with the following frequencies:

- Daily (for example, every day, only weekdays, or every 2 days)
- Weekly (specific days of the week; for example, Mondays)
- Monthly (specific days of the month; for example, January 1 and October 5)
- One Time Only
- When My Computer Starts

Note: If you Shut down and then Start your machine instead of using Restart, it is important that you first disable the fast startup option given in the Power Options settings of Control Panel.

For example, if you are using Microsoft Windows 8, 8.1 or 10, follow these steps:

1. Go to Control Panel → Power Options

2. Click Choose what the power button does Change settings that are currently unavailable.

3. Disable Turn on fast startup option

Refer the [Microsoft](#) website for details.

- When I Log On

To ensure the computer is unlocked when a scheduled task runs, see [Auto Login](#).

Note:

Schedules not visible after upgrade? Refer 'Troubleshooting Excel Command Tasks' section in Troubleshooting for details.

## Using the Trigger Manager

Use the Trigger Manager to display, add, modify, and delete triggers you have set for your tasks.

Over time, you might create several triggers that run various automated tasks. For example, a single task might be run using five different triggers, or a single trigger might run five different tasks. As the number of tasks and triggers grow in number, you will want to organize and manage these triggers.

Using the Trigger Manager, you can:

- Add a trigger
- Modify a trigger
- Delete a trigger
- Enable a trigger
- Disable a trigger

To use the Trigger Manager, follow these steps:

1. In the main Automation Anywhere window, click the Trigger Manager tab on the left side. The Trigger Manager window opens, showing the tasks that are driven by each trigger.
2. Add additional triggers or work with your existing triggers:
  - To add a new trigger, click the Add button.
  - To edit an existing trigger, click the Edit button.
  - To delete an existing trigger, click the Delete button and click Yes to confirm.
  - To enable a trigger, ensure that the check box in the far left column is checked.
  - To disable a trigger, un-check the check box in the far left column.

To enable or disable all triggers at once, check or un-check the check box at the top of the Trigger Manager window.

If you find that triggers are not working with a Microsoft Office file that is modified, you need to select When file is renamed from the Action list. The trigger now works correctly. This is the inherent behavior of Microsoft Office.

Note: When using on Windows login, the trigger for scheduled tasks, it can take some time to start. The recommendation is to wait for the trigger event to launch when you start your machine and use Windows credentials to login.

Related reference

[Scheduling Tasks to Run](#)

## Calling Tasks from Programs or Scripts

You can call Automation Anywhere tasks from other programs, scripts, or batch files.

By default, Automation Anywhere saves all tasks in the folder named:

My Documents\Automation Anywhere Files\Automation Anywhere

### Calling a Task from a Batch File

Task-name: download-emails.atmx

- Call the task named `download-emails.atmx` from a batch file by adding the following line in the batch file:

```
"C:\Program Files\Automation Anywhere 7.0\Client\AA.Player.exe"
```

```
"/fD:\My Documents\Automation Anywhere Files\Automation Anywhere\My Tasks\download-emails.atmx/e"
```

### Calling a Task from an Excel Macro

Task-name: download-data.atmx

- To call the `download-data.atmx` task from an Excel macro, add the following text to the Excel macro:

```
Dim RetVal
```

```
RetVal = Shell("C:\Program Files\Automation Anywhere Enterprise 7.0\Client\AA.Player.exe "/fD:\My Documents\Automation Anywhere Files\Automation
```

```
Anywhere\My Tasks\download-data.atmx"/e", 1)
```

- If the task is successful, it returns 0 to the calling program. If it encounters an error, it returns 1.

## Uploading - Pending Changes or Files

As a Bot Creator with access privileges to particular folders, you can upload files from folders to the server using different options if Version Control is enabled in Control Room.

- 'Upload Pending Changes' to upload files from a selected folder in the Tasks, Workflows and Reports list.
- Upload selected files from the Repository.

## Uploading Pending Changes

Use the Upload Pending Changes option when you want to upload files from a folder in Tasks list, Workflow and Reports. These folders and sub-folders comprise new and/or checked out files that are pending upload.

1. To upload, select the 'Upload Pending Changes' option from the context menu:

As you can see, all files other than the ones that have a remark are enabled by default for upload in the Upload Pending Changes window.

However, the files that have  are not selected as either:

- A file with same name exists in the repository.
- The file is part of a folder to which the user does not have access.
- The file is not checked out by the Bot Creator
- The file is force unlocked by the server administrator

2. Now select the files to upload.

3. Input the required comments in 'Upload Comment' and click Upload. These comments are applicable to all files that are uploaded.

Note: During upload any failure results in cancellation of operation.

Once upload finishes, the list view will reflect the check in status.

## Uploading Files

1. Click the Upload button
2. In the Upload Files window, the files that are 'Allowed' to be uploaded are selected; if required, de-select the files that you do not want to upload.
3. Add your 'Upload Comments' and click 'Upload'.These comments are applicable to all files that are uploaded.

## File Status and Action <update>

The following table describes the status of a file and the action that is marked for the same:

Status Description	File Status	Action
If the File is checked out by the Client	Checkout	Allowed
If the File is checked out by another Client or force unlocked by server administrator	Locked	Not Allowed
If the File is new and does not exists in the server repository	New	Allowed
If the File is new and exists in the server repository	Duplicate	Not Allowed
If the File is new and folder access unavailable	New	Not Allowed

Related reference

[Uploading comments](#)

[Viewing Version History](#)

## Uploading and downloading bots, workflows, and dependencies

Use the Enterprise client to upload and download TaskBots, Master Bots, MetaBots, and Workflows with any related dependencies to and from the Repository.

Use the Enterprise client upload and download feature to ensure that dependent TaskBots, MetaBots, IQ Bots, and related dependent files are automatically included.

Note: When Version Control is enabled for Version 11.3 and later, automatic uploading and downloading of tasks and dependencies is available.

To access the upload or download feature select a file and right click, or select a file and click upload or download in the menu.

The following list of dependent file types are automatically included when using the Enterprise client uploaded or downloaded feature.

ATMX - Automation Anywhere Task File	PDF - Portable Document Format
BMP - Bitmap	PKX - Rational XDE (IBM)
CSV - Comma Separated Values	PNG - Portable Network Graphic
DOC - Microsoft Word Document	TXT - Text
DOCX - Microsoft Word Open XML	XLS - Microsoft Excel File
EXE - Executable File	XLSX - Microsoft Excel Open XML Spreadsheet
JPEG - Joint Photographic Experts Group	XML - Extensible Markup Language
MDB - Microsoft Access Database	

## VCS enabled upload and download

When Version Control Service (VCS) is enabled, upload or download bots and any related dependencies, such as other TaskBots, MetaBots, IQ Bots, and other related dependencies. This simplifies the process of uploading and downloading TaskBots to Enterprise Control Room, eliminating the need to upload dependencies separately.

- To upload a Master Bot, you must checkout the file.
- All bots must have a unique name regardless of which user uploads the bot.
- The task dependency scanner and [Uploading - Pending Changes or Files](#) works for files that are new, checked-out, and eligible for upload.
- When VCS is enabled, you can download all the tasks and dependencies.

## Upload and download failure remarks

When a bot or dependent files fails to upload or download, the Remarks column displays the reason for the failure.

### Invalid file format

The file format is not supported by Automation Anywhere.

### File not found

The file path to an application used in a TaskBot cannot be resolved.

**Not licensed**

A user without the correct role or license configuration cannot download or upload a bot with all of its related dependencies.

**Password protected bot**

A bot that is password protected cannot be uploaded or downloaded.

**Insufficient folder privileges**

When the user trying to upload or download a bot does not have the required access permissions for that particular folder.

**Cyclic dependency**

A potential cycle conflict exists between bots when the same files are included in dependent bots.

**Variabaled path**

The specified variable in the file or folder path does not match the \$AAAAApplicationPath\$ used to select, open, or save files and folders.

**Locally renamed MetaBot**

When a user renames a local copy of a MetaBot and it no longer matches the name of the MetaBot used in the associated TaskBot.

**File with same name already exists**

When VCS is enabled and a user tries to upload a file that already exits in the repository.

**File is force unlocked by server administrator**

When VCS is enable, an administrator force unlocked file cannot be uploaded to the repository.

## Viewing Version History

Use Version History to view the history of updates to the selected file. Also compare and roll back updates, if required.

On selecting Version History, you will be able to view a list of all revisions created for the selected file

### Viewing history of file versions

You can view 'Version History' of the selected file from:

1. The Context Menu:

OR

2. Actions list:

3. On selecting Version History, you will be able to view versioning details for the selected file

The Version History is displayed in descending order of the time-stamp i.e. the latest revision at the top and the first revision at the bottom. It allows you to identify the user and relevant 'Action' that was performed during a specific 'Date and time' with relevant check in 'Comments'.

Here, you can:

1. Compare two versions of a file.

2. Roll back the updates to a specific version.

1. Compare: Use this to compare different file versions.

Tip: Press the Control key to select two file versions.

In the Compare window, the updates between the selected files are displayed:

Note:

The latest version is displayed in the right window.

It is recommended that before checking in any file, compare the latest file that has been updated with the local file to ensure all updates are included.

When a file is checked out for editing, the changes to the file are saved locally. Before the changes are checked in, it is recommended you compare it with the latest version of the file. To do this, select the latest version in the list and click 'Compare'. The Compare window will compare the latest version with local version as shown below:

2. Rollback: Use this to revert updates/changes in the selected file to the selected version from the version history.

Select the version to which you want the updates to be rolled back and confirm:

On confirming, all the changes done since the selected version to the latest version will be rolled back.

Note: It is recommended you check in (upload) the file once it is rolled back to the selected version so that the latest version reflects the updates.

- **Uploading comments**

Upload comments to use as reference for uploading bots when Version Control is enabled in the Enterprise Control Room.

Related reference

[Copy or Rename a Task](#)

[Editing TaskBots](#)

[Deleting a TaskBot](#)

[Comparing Files that Reside on the Client and Server](#)

[Uploading and Downloading Tasks to the Server](#)

## Uploading comments

Upload comments to use as reference for uploading bots when Version Control is enabled in the Enterprise Control Room.

Available with Enterprise Edition on purchase of a Version Control license only.

If you are enabled for version control, you will have to include comments while uploading your files. This ensures that the version history can be used as a reference point.

**Upload Comment**

Enter Comment:

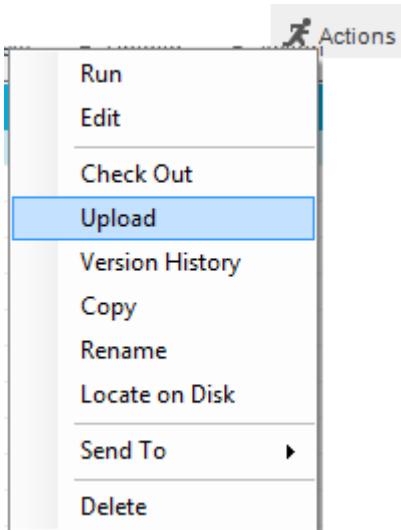
Save Cancel



## Uploading a Task to the Server

You can upload tasks to the Enterprise Control Room Repository Manager using any of the four methods:

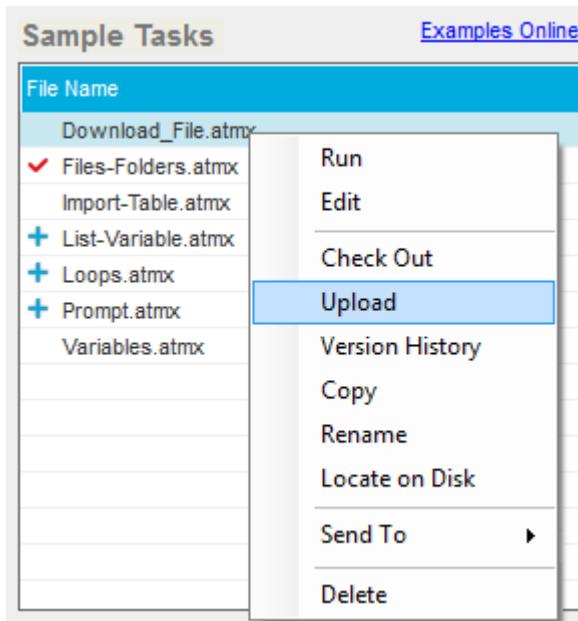
1. Selecting Upload from the Action button drop-down list



2. Clicking the 'Upload' button at the top right 'Task List' pane



3. Right clicking the selected task and choosing 'Upload'



4. Selecting the task from the Repository feature:

The screenshot shows the 'Repository' interface with two main sections: 'Server Task Folder' and 'Client Task Folder'.

**Server Task Folder:**

Name	Type	Date Modified	Status
1233.atmx	Task File	6/3/2014 11:35:01 AM	Same
Active_Directory.atmx	Task File	2/15/2014 5:36:23 PM	Same
Analytics.atmx	Task File	8/26/2014 4:08:50 PM	Same
Excel Command.atmx	Task File	10/2/2014 5:42:52 PM	Same
TE_Share_Session.atmx	Task File	8/20/2014 6:00:24 PM	Same

**Client Task Folder:**

Name	Type	Date Modified	Status
Crossword.atmx	Task File	9/22/2014 11:58:23 AM	New
Crossword3.atmx	Task File	9/22/2014 6:04:49 PM	New
Cumulus Script.atmx	Task File	1/27/2014 3:01:00 PM	New
Error Handling.atmx	Task File	1/17/2014 3:38:50 PM	New
error.atmx	Task File	7/4/2014 3:30:21 PM	New
Excel Command - Copy Cells to ano...	Task File	11/27/2013 6:13:54 PM	New
Excel Command.atmx	Task File	10/2/2014 5:42:52 PM	Same
Excel1.atmx	Task File	7/8/2014 7:05:49 PM	New
Excel123.atmx	Task File	8/7/2014 3:19:57 PM	New
Excel Headers.atmx	Task File	8/12/2014 4:02:10 PM	New

Buttons at the bottom: Upload, Download, Compare, Delete.

- When the task is successfully uploaded, a confirmation window is displayed. Click OK.
- The task is displayed in the Server Repository Manager.

## Downloading a Task from the Server

To download a task from the Repository Manager, you must follow these steps:

1. In the main Automation Anywhere window, click on Manage > Repository tab. The Repository is displayed, with a split screen showing files that reside on the server- Enterprise Control Room as well as the client.
2. Highlight the task file that you want to download to the client.
3. Click the Download button. The task is copied to the client.

 Note: Be aware that files that are downloaded to the client with same names will be overwritten. Before downloading files, be sure that the latest version of the task is on the server.

Related reference

[Uploading and Downloading Tasks to the Server](#)

[Viewing Version History](#)

[Working with tasks](#)

## Troubleshooting Scheduled Tasks

If a scheduled task fails to run using the scheduler, follow these steps to resolve the problem:

1. Ensure that you specify the correct user name and password.

If your account requires a password to log on, specify that password when scheduling tasks. Otherwise, no password is required.

2. If you have multiple accounts, verify that the correct user name and password are used.

If you have multiple accounts on the same computer, such as a domain account and a local account, verify that the user name you specified is the same user name that is used to log into the computer. Scheduled tasks will not run if the scheduled task attempts to run under a different user account. Automation Anywhere pre-fills the user name field with the user name you used to log in.

3. Verify the task status in Control Panel.

To verify the status of the task in the Control Panel, follow these steps:

- a) Open the Control Panel and click Scheduled Tasks.
- b) Select the task that corresponds to your task (the file starts with your task name).
- c) Right-click the task and select Run. If the task does not run, check the Status column.

4. Schedule the Calculator Application.

If your task still does not run, follow these steps:

- a) Open the Control Panel and click Administrative Tools.
- b) Click on the Task Scheduler.
- c) In the Active Tasks drop-down, select Calculator. If the calculator does not run, the scheduler service is not installed properly on your computer.

5. Verify that the Task Scheduler service is started.

By default, the Scheduler service is started. To verify that the service is started, follow these steps:

- a) Open the Control Panel and click Administrative Tools. Select Services.
- b) Verify that the status of the Task Scheduler service is Started.
- c) If the status is not Started, right-click it and select Start.
- d) Verify that the Startup type is set to Automatic. This ensures that the service will start automatically in the future.

6. Restart the Task Scheduler.

If the problem persists, restart the Task Scheduler by following these steps:

- a) Open the Control Panel and click Scheduled Tasks.
- b) In the Advanced Menu, click Stop using Task Scheduler.
- c) Wait for 10 minutes.
- d) Click Start using Task Scheduler to restart the Task Scheduler service.

7. Contact Technical Support.

After completing these steps, if you are not able to run the task as scheduled, it is likely that the scheduler service is not installed correctly on the computer. Contact Technical Support at: [Open a Support Case](#).

Related tasks

[Debugging TaskBot](#)

Related reference

[Scheduling Tasks to Run](#)

[Run a task](#)

## Enabling Version Control in Automation Anywhere

Automation Anywhere has an integrated feature on Version Control that allows users to manage various versions of files and enforce controlled edits.

### Subversion Support

Note: Subversion is provided by the Apache Subversion software project.

1. Subversion 1.8.13 and 1.8.14 with Visual SVN Server 3.3.x (Recommended)
2. Subversion 1.7.2 with Visual SVN Server 2.5.2

Note: You can configure your own instance of Subversion; however, we recommend Visual SVN Server as the SVN Server for Subversion.

File Name	Type	Repeat	Status	Last Run Time
Analytics_ATM Reconciliation.atmx	Task File	Do not Repeat		
Analytics_MortgageProcessing.atmx	Task File	Do not Repeat	Complete	11/20/2018 15:04:50
Analytics_TelecomOrderEntry.atmx	Task File	Do not Repeat		
Files-Folders.atmx	Task File	Do not Repeat		
List-Variable.atmx	Task File	Do not Repeat		
Loops.atmx	Task File	Do not Repeat		
Prompt.atmx	Task File	Do not Repeat		
Variables.atmx	Task File	Do not Repeat		

Control the versioning of files - TaskBots (IQBots and MetaBots included), Docs, Reports and Workflows in Clients by turning on the feature from Automation Anywhere Control Room.

## Enabling Version Control in Enterprise Control Room

As a Enterprise Control Room administrator, you can enable Version Control and configure it to an existing or new server repository.

The Enterprise Control Room is tightly integrated with 'SubVersion' version control system so that the versioning, checkin/checkout and other functionality can be leveraged with ease, for all files.

## Control Room Settings

### Control Room Configuration

#### Version Control Configuration

Version Control:  Enable  Disable

Use Secure Connection

\*SVN Server Name or URL

\*SVN Repository Path

80

\*DomainUsername

\*Password

**Connect**

Server Path:

Local Path: C:\Users\Public\Documents\Automation Anywhere Server Files\Default

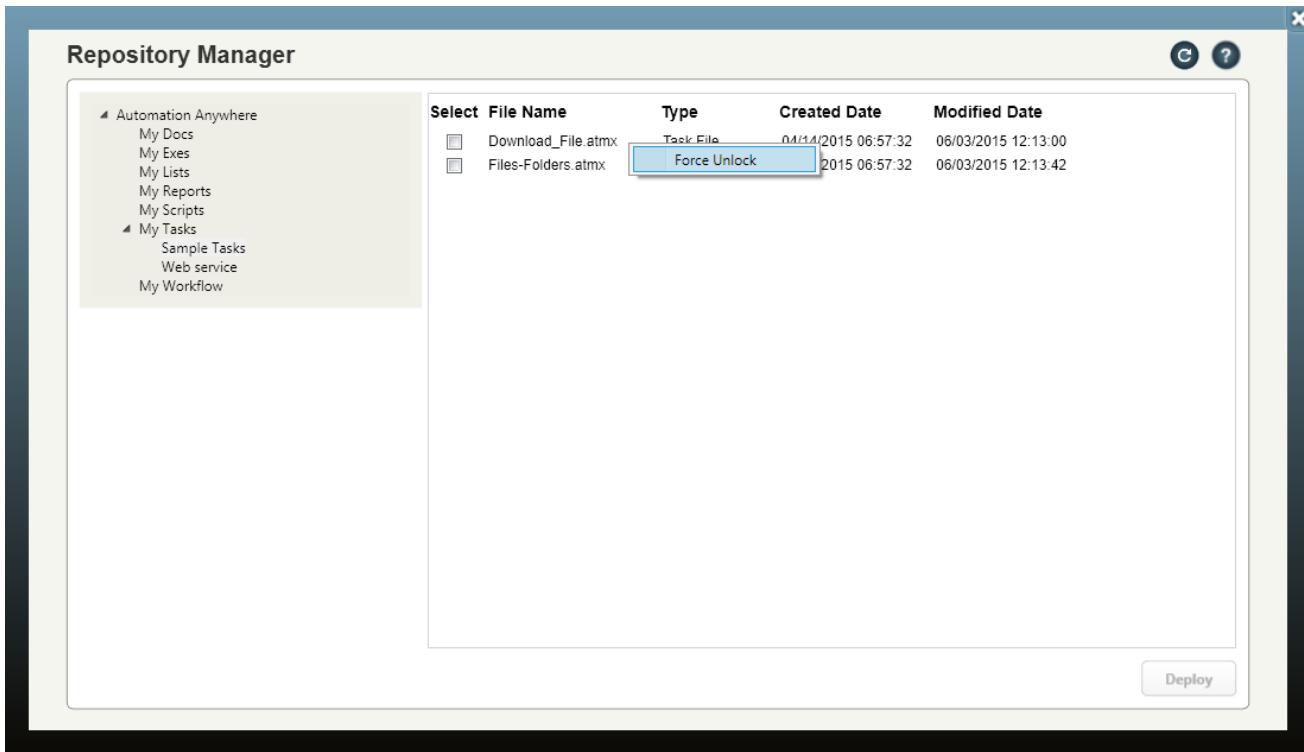
*Repository Uploaded on*

### Outgoing Mail Server Configuration

### Email Notifications

See [Bots - Configure Version Control](#).

Moreover, to unlock an existing file in the repository, you can forcefully unlock a file thus enabling users to edit.



[Learn More](#)

## Using Version Control in Client

To perform controlled edits to your files - TaskBots (IQBots and MetaBots included), Docs, Reports and Workflows, use versioning to create new files, check out for edit, upload with comments and download from the server repository.

 Note: You have to be logged into the Enterprise Control Room to be able to use this feature.

The screenshot shows a list of sample tasks on the left and a context menu on the right. The menu items are:

- Run
- Edit
- Check Out
- Upload
- Version History
- Copy
- Rename
- Locate on Disk
- Send To ▾
- Delete

1. Create: You can create a new file in the local repository. A plus sign (+) indicates the file is new.
2. Edit: You can edit a file only if it has been 'Uploaded' and 'Checked Out'.
3. Check Out: A file that already exists in the server repository can be checked out for editing. A check mark (✓) indicates the file is checked out.
4. Upload: Post editing, you can upload a file to the server repository with comments. No prefixed icon/ sign denotes a successful upload.

You can also upload files from a specific folder from the Tasks List/Repository.

5. Version History: You can view revisions to a file and if required, roll back any updates.
6. Copy and Rename: You can make a copy of a selected file in the local repository provided it has not been checked out.
7. Delete: You can delete a file from the local repository provided it has not been checked out.

You can also perform similar operations using Actions.

### Actions

Related reference

[Enabling Version Control in Automation Anywhere](#)

[Uploading comments](#)

[Uploading - Pending Changes or Files](#)

[Viewing Version History](#)

[Copy or Rename a Task](#)

[Working with tasks](#)

## Viewing System Logs

Automation Anywhere logs all events that occur in the application. Major events, such as a task run, task creation, and changes to task properties are logged.

To view this logged data, Automation Anywhere provides System Logs. The System Logs show all client activities. These reports are very useful for monitoring and troubleshooting.

The screenshot shows the 'System Logs' window with the title 'Task Run Logs'. At the top, there are filters for 'Select Log Type' (set to 'Task Run'), 'Start Date' (10/07/2015), and 'End Date' (10/07/2015). A 'Generate Logs' button is also present. Below the filters is a table titled 'Task Run Logs' with columns: Sr. No., Task/Variable Name, Date, Time, and Description. The table contains five entries:

Sr. No.	Task/Variable Name	Date	Time	Description
1	List-Variable.atmx	10/07/2015	10:49:23	Task Run, Started, D:\Automation Anywhere Files\Automation A...
2	List-Variable.atmx	10/07/2015	10:49:46	Task Run, Completed, D:\Automation Anywhere Files\Automation...
3	Sub-flow_sample.atmx	01/06/2015	13:12:34	Task Run, Completed, D:\Automation Anywhere Files\Automation...
4	Prompt.atmx	01/06/2015	13:12:34	Task Run, Failed, D:\Automation Anywhere Files\Automation Anyw...
5	Import-Table.atmx	12/07/2015	12:42:39	Task Run, Timed Out, D:\Automation Anywhere Files\Automation...

At the bottom, there is an 'Export to CSV file' field containing 'D:\Automation Anywhere Files\10-07-2015.csv', a 'e.g. C:\Reports\first.csv' example, an 'Export' button, and an 'OK' button.

To view the system logs, follow these steps:

1. From the main Automation Anywhere window, click on the Tools menu and select System Logs.
2. Select the Log Type from the drop-down list. The types include:
  - Task Creation
  - Task Run
  - Task Modification
  - Task Deleted
  - WorkFlow Creation
  - Workflow Run
  - Workflow Modification
  - Workflow Deleted
  - Report Creation
  - Report Run

- Report Modification
- Report Deleted
- Task To Exe
- Schedule
- Trigger
- Task Properties
- App Configuration
- File
- Folder
- Script
- Other

1. Specify the Start and End dates in the format you specify.
2. Click Generate Logs.
3. To export the logs to a CSV file, specify the name of the CSV file and click Export.
4. To delete an entry, select the check box next to the log and click Delete.

Related reference

[Using the Error View](#)

[Enabling the Debugging Option](#)

[Logging into Windows when Application Paths Change](#)

## Debugging TaskBot

Automation Anywhere enables users to debug TaskBot Logic.

Follow these steps:

### Procedure

1. Display the Debug Toolbar either:

- click Enable Debugging,
- or click on the Debug menu and select Enable Debugging.

The Variable(s) Watch Table window is displayed.

2. Insert Breakpoints in the Task.

Select a command and insert a Breakpoint either:

- click Toggle Breakpoint on the Debug Toolbar,
- or press F9.

3. Debug the Logic action-by-action with the Step Over button (or the F10 function key).

4. Run the task in Debug mode one command at a time to isolate any errors.

5. To remove a Breakpoint, select the command and either:

- click Toggle Breakpoint,
- or press F9.

To clear all Breakpoints, click the Clear All Breakpoints button on the Debug Toolbar.

6. Click Set SnapPoint to capture images of the Task while it runs. Click Visualize to view the images that are captured when using the Set SnapPoint option in Debug mode.

7. To stop debugging, either

- click Disable Debugging,
- or click on the Debug menu and select Disable Debugging.

Note:

- Automation Anywhere does not store debugging information (Breakpoints). When exiting application, be aware that all Breakpoint information will be lost.
- **11.3.3** The Debug menu option is disabled for a protected bot.
- **11.3.3** The Enable Debugging option is not available for a protected bot.

Related reference

[Watching Variables](#)

## Communicating with the Server

These topics provide information to help you communicate with the Automation Anywhere Small Business Server (or Enterprise Enterprise Control Room) from your Automation Anywhere Client.

- [Uploading and Downloading Tasks to the Server](#)

This topic describes how to use the Repository to move automation tasks to and from the server.

- [Comparing Files that Reside on the Client and Server](#)

Your team of automation users can create, upload, edit, and run many tasks, moving task files between the client and server. Maintaining several copies of task files and having multiple users modify single tasks can require the need for users to view how and when a task file was last changed.

## Uploading and Downloading Tasks to the Server

This topic describes how to use the Repository to move automation tasks to and from the server.

- The Enterprise client provides an easy-to-use facility for communicating with the server.
- To launch the Repository facility, click on the Repository tab on the main client screen.
- Ensure the client is already registered with the server.

You can use the Repository to perform the following tasks:

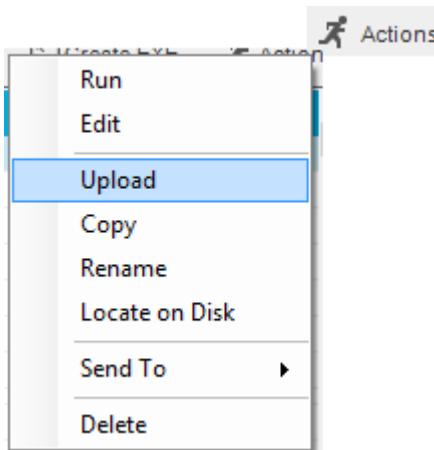
- Transferring tasks between the client and server.
- View the date and time that a task was last modified on the client or the server.
- View any new tasks that have been created on a client or uploaded to the server.
- Compare task files to identify differences between versions of the files that reside on the client and server.

Refer [Comparing Files that Reside on the Client and Server](#) for details.

## Uploading a Task to the Server

You can upload tasks to the server (or the [Enterprise Control Room Repository Manager](#)) using any of the four methods:

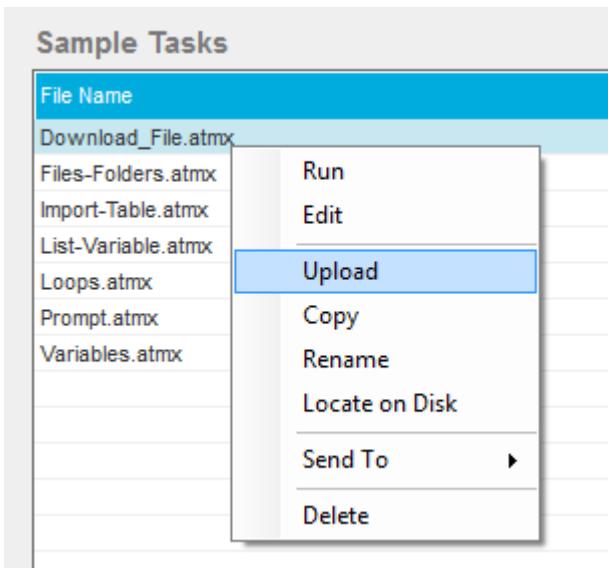
1. Selecting Upload from the Action button drop-down list



2. Clicking the 'Upload' button at the top right 'Task List' pane



3. Right clicking the selected task and choosing 'Upload'



4. Selecting the task from the Repository:

**Repository**

**Server Task Folder**

- Automation Anywhere
  - My Tasks
    - Acceptance Tasks

**Automation Anywhere\My Tasks**

Name	Type	Date Modified	Status
1233.atmx	Task File	6/3/2014 11:35:01 AM	Same
Active_Directory.atmx	Task File	2/15/2014 5:36:23 PM	Same
Analytics.atmx	Task File	8/26/2014 4:08:50 PM	Same
Excel Command.atmx	Task File	10/2/2014 5:42:52 PM	Same
TE_Share_Session.atmx	Task File	8/20/2014 6:00:24 PM	Same

**Client Task Folder**

- Automation Anywhere
  - My Docs
  - My Exes
  - My Reports
  - My Scripts
  - My Tasks
    - Acceptance Tasks
      - Acceptance Tasks2
      - Active Directory
      - Category\_System
      - RegDestDir
      - Sample Tasks
  - My Workflow

**Automation Anywhere\My Tasks**

Name	Type	Date Modified	Status
Crossword.atmx	Task File	9/22/2014 11:58:23 AM	New
Crossword3.atmx	Task File	9/22/2014 6:04:49 PM	New
Cumulus Script.atmx	Task File	1/27/2014 3:01:00 PM	New
Error Handling.atmx	Task File	1/17/2014 3:38:50 PM	New
error.atmx	Task File	7/4/2014 3:30:21 PM	New
Excel Command - Copy Cells to ano...	Task File	11/27/2013 6:13:54 PM	New
Excel Command.atmx	Task File	10/2/2014 5:42:52 PM	Same
Excel1.atmx	Task File	7/8/2014 7:05:49 PM	New
Excel123.atmx	Task File	8/7/2014 3:19:57 PM	New

**Upload**    **Download**    **Compare**    **Delete**

- When the task is successfully uploaded, a confirmation window is displayed. Click OK.
  - The task is displayed in the Server Repository Manager.

Note: If you have configured Version Control, you will have to add comments while uploading the task.  
[Uploading comments](#)

To download a task from the server (or Enterprise Control Room Repository Manager), you must use the Repository facility. Follow these steps:

1. In the Main Automation Anywhere window, click on the Repository tab. The Repository facility is displayed, with a split screen showing files that reside on the server as well as the client.
  2. Highlight the task file that you want to download to the client.
  3. Click the Download button. The task is copied to the client.

## Note:

- Be aware that files that are downloaded to the client with same names will be overwritten. Before downloading files, be sure that the latest version of the task is on the server.

The upload and download dependencies table includes the Protection Type column for identification of protected bots. This column is shown only for bots located within the Bot Store folder.

## Related reference

## Comparing Files that Reside on the Client and Server

## Comparing Files that Reside on the Client and Server

Your team of automation users can create, upload, edit, and run many tasks, moving task files between the client and server. Maintaining several copies of task files and having multiple users modify single tasks can require the need for users to view how and when a task file was last changed.

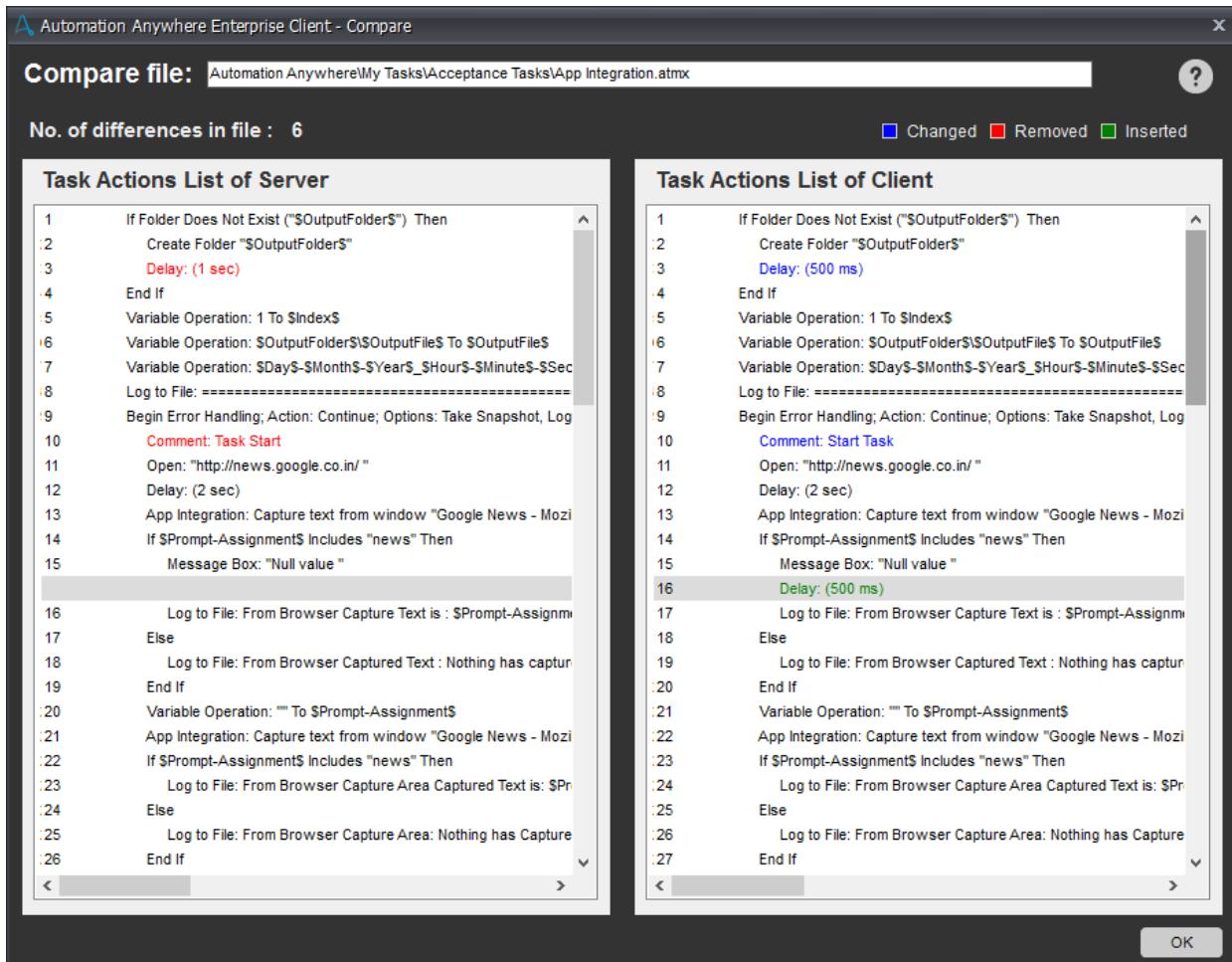
This topic describes how to compare versions of task files that reside on the client and server. Using the Compare File feature, you can compare two different versions of a task file to identify any recent changes. You can view these differences by using the Task Actions List panes that are generated after running the comparison.

To run a comparison of two task files, follow these steps:

1. Launch the Repository facility by clicking on the Repository under Manage tab on the main client screen. Make sure that the client is already registered with the server.
2. Highlight the task file you would like to compare by clicking once on the file name, either in the Server or Client pane. In presence of a file with duplicate name in the Client or Server, the Compare button is enabled.



3. Click on the Compare button to run the comparison. A new window is launched, displaying the comparison results.



- If no differences between the files are found, the message "No differences found." is displayed at the top.
- If differences are found, the number of differences is displayed at the top.
- Differences in the task file actions are displayed in the following colors:
  - BLUE: Changed. Task actions that have been changed are marked in blue.
  - GREEN: Inserted. Task actions that have been newly inserted are marked in green on the client, and are shown as a blank line on the server.
  - RED: Deleted. Task actions have been deleted are marked in red on the server, and are shown as a blank line on the client.

#### Related reference

[Uploading and Downloading Tasks to the Server](#)

## Enabling Remote Desktop Connections

This topic provides information about using Remote Desktop applications to run your automated processes.

## Running Automated Tasks under a Minimized Session

When you minimize a remote desktop window (the window that displays the desktop of the remote computer), the operating system switches the remote session to the non-GUI mode and does not display windows and controls.

As a result, Automation Anywhere is unable to interact with the application GUI. At this point, the automated GUI task fails.

To run GUI tasks on a remote computer while minimizing the remote desktop window, change the registry keys on the computer from which you connect to the remote Automation Anywhere workstation. Complete the following steps:

1. Log into the computer from which you connect to remote computers.
2. Close all open remote desktop sessions.
3. Click Start -> Run (or Windows + R).
4. In the Run dialog window, type "regedit" and press Enter.

The Registry Editor starts.

5. Navigate to one of the following registry keys, depending on whether you want to modify the remote desktop settings only for the current user or for all users on the computer:
  - HKEY\_CURRENT\_USER\Software\Microsoft\Terminal Server Client
  - HKEY\_LOCAL\_MACHINE\Software\Microsoft\Terminal Server Client
6. Create a DWORD value named RemoteDesktop\_SuppressWhenMinimized and set it to 2.

When you minimize the Remote Desktop Connection window on your computer, the remote computer GUI should not be affected, making the GUI available to your automated tasks.

7. Close the Registry Editor.

Note: Changes made to the registry can affect the overall performance and function of the system. Automation Anywhere is not responsible for adverse system behavior that results from making registry changes. Working with your system administrator is advised.

## Using VNC - An alternative to Remote Desktop

In general, Remote Desktop applications do not allow automation software to run or perform tasks when you minimize or close the window. Remote Desktop creates a session for every connection made to the remote machine. Under this session, it provides the connecting machine with complete rights to control the remote machine.

However, when disconnecting from or minimizing the remote window, Remote Desktop retrieves the rights and any access to the GUI of the remote machine is lost. This causes automated tasks to lose control of the remote system, and they do not run as expected.

Tip: Use Virtual Network Computing (VNC) to connect to the server. VNC allows you to run automated tasks even when the session is minimized or disconnected.

- VNC establishes connections with the remote system in a different manner from Remote Desktop. VNC physically connects to the remote system, rather than creating sessions for each connection. The connection retains controls on the remote GUI, even when the VNC window is minimized or disconnected.

- 
- Your automated tasks can continue to run in the same manner as they do on a local machine.

Related information

<http://www.realvnc.com/download/vnc/>

## Commands

The following Enterprise client commands are available for use.

- [Active Directory command](#)

Use this command to manage the Active Directory and to create, modify, and delete users in the system with centralized control.

- [App Integration command](#)

Use this command to integrate applications with an automated task and capture text data.

- [Citrix Automation](#)

Citrix Automation command enables you to automate tasks remotely for the application available on a Citrix environment.

- [Clipboard command](#)

Use the Clipboard command to automate Windows clipboard activities.

- [Comment command](#)

Use this command to insert comments in your automation tasks to provide additional information about the TaskBot / MetaBot Logic.

- [Database command](#)

Use the Database command to convert, export, import, or transfer data between a database and other applications.

- [Delay/Wait command](#)

Use the Delay/Wait command to add a timed delay or a wait condition to TaskBot/MetaBot Logic.

- [Email Automation command](#)

Use the Email Automation command to automate tasks for the mail server and incoming messages.

- [Error Handling command](#)

Use the Error Handling command to aid in debugging when running the TaskBot / MetaBot Logic.

- [Excel command](#)

Use this command to transfer data to and from Microsoft Excel spreadsheets.

- [Export Dataset command](#)

Use this command to extract large amounts of data from a single source and save it to an external file, such as an Excel spreadsheet.

- [File and Folder command](#)

Use this command to automate operations that involve manipulating files and folders.

- [FTP / SFTP command](#)

Use this command to automate any FTP or SFTP operations.

- [IF/ELSE command](#)

Use this command to add conditional logic and actions.

- [Image Recognition command](#)

Use this command to search for an image within a source image.

- [Import DataSet command](#)

Use this command to insert huge amounts of data from a single source.

- [Internet Connection command](#)

Use this command to automatically connect to the Internet using a dial-up connection.

- [Insert Keystrokes command](#)

Use this command to automate the typing of keystrokes in English, German, French, Italian, or Spanish characters.

- [Launch Website command](#)  
Use this command to launch a website.
- [Log-to-File command](#)  
Use this command to create a log file with data about the events that occur while TaskBot / MetaBot Logic runs.
- [Loop command](#)  
Use this command to repeat a sequence of commands.
- [Manage Window Controls command](#)  
Use this command to capture Windows control properties, such as buttons, list box items, text boxes, menu tabs, combo boxes, check boxes, and tables. You can perform actions with these controls or assign the captured properties to variables. You can also use this command to simultaneously record actions that you perform.
- [Message Box command](#)  
Use this command to insert a message box that will display a message when the Task runs.
- [Mouse command](#)  
Use this command to add mouse clicks to the Logic.
- [Object Cloning command](#)  
Use this command to capture coordinates and images of objects from desktop and web-based applications. When the task runs, this command searches and plays the object based on the object properties selected for search criteria.
- [OCR Command](#)  
Use this command to extract text from images and transfer the extracted data to another application.
- [Open Program/File command](#)  
Use the Open Program/File command to automatically launch a program or open a file.
- [Pause command](#)  
Use the Pause command to pause an automated task at a particular point when it runs.
- [PDF integration command](#)  
Use the PDF integration command for PDF manipulation tasks including extract, merge, split, encrypt, and decrypt.
- [PGP command](#)  
Use the PGP (Pretty Good Privacy) command to automatically encrypt and decrypt files for security.
- [Play Sound command](#)  
Use the Play Sound command to insert and play sounds before or after running an action.
- [Printer Settings command](#)  
Use the Printer Settings command to automate printer settings.
- [Prompt command](#)  
Use the Prompt command to insert a user prompt that requests input from a user when running an automated task.
- [Read from CSV/Text command](#)  
Use the Read from CSV/Text command to automate the process of reading data from CSV and Text files and encode the files using ANSI, Unicode, or UTF8.
- [REST Web Service command](#)  
Use the REST Web Service command to test REST webservices using the HTTP methods GET, POST, PUT, and DELETE.
- [Run Script command](#)  
Use the Run Script command to run scripts from the TaskBot / MetaBot Logic.
- [Run Task command](#)  
Use the Run Task command to enable nesting of several tasks into a master task.
- [SAP Integration Command](#)  
Automation Anywhere allows you to automate tasks and processes on your SAP system using the SAP Integration command.
- [Screen Capture command](#)  
Use the Screen Capture command to automate the process of capturing screen shots.

- [Send Email command](#)

Use the Send Email command to automate tasks relating to sending emails.

- [Services command](#)

Use the Service command to automate operations in Windows and application services including start, stop, pause, resume, or get status of services.

- [SNMP command](#)

Use the SNMP command to automate network management.

- [Stop Task command](#)

Use the Stop Task command to stop an automation task from running.

- [SOAP Web Service command](#)

Use the SOAP Web Service command to access and exchange information over the internet.

- [String Operation command](#)

Use the String Operation command to manipulate text strings or extract part of a string and store it in a variable.

- [System command](#)

Use the System command to automate tasks relating to the computer system.

- [Terminal Emulator command](#)

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.

- [Variable Operation command](#)

Use the Variable Operation command to assign variables to a TaskBot / MetaBot Logic.

- [Web Recorder command](#)

Use the Web Recorder command to automate internet-related tasks.

- [Windows Actions command](#)

Use the Windows Actions command to automate Windows-based actions, for example, activating, resizing, minimizing, maximizing, or closing an application window.

- [Workload command](#)

Use the Workload command to manage complex workflow by configuring a bot to perform work items from multiple queues.

- [XML command](#)

Use the XML command to process XML information that is generated from web services and cloud computing applications.

## Active Directory command

Use this command to manage the Active Directory and to create, modify, and delete users in the system with centralized control.

### Overview

An Active Directory is a directory service provided by Microsoft to assist the admin in managing users across a group or organization. All of the fields for the Active Directory command support the use of variables.

Automation Anywhere uses LDAP (Lightweight Directory Access Protocol) to read from and edit users in the Active Directory. The Server name and Domain name are combined to create an LDAP path, which is used to connect to the Active Directory.

## Establishing a Connection with Active Directory

To manage users in the Active Directory, ensure that a connection is established between the Administrator and the Active Directory server. Users who are logged into the Active Directory should have privileges for connecting to the Active Directory server and viewing the Server name, Domain name, user name and password details.

### Create User

Adds a new user.

### Modify User

Modifies or renames a user.

Note: Alternately, if unsure of the User Name that has to be modified, click the browse button in Enter LDAP Path section to select a user from the Active Directory Object Browser.

Select a User Action from the drop-down menu:

- Rename User: Renames the user logon name and/or the user account name.
- Delete User: Deletes the user from the Active Directory. Select from the User Name or Logon Name radio buttons in the Enter Modify User Details section.
- Enable User Account: Enables a user account.
- Disable User Account: Disables a user account. Select from the User Name or Logon Name radio buttons in the Enter Modify User Details section.
- Update User Details: Use this option to update the user's details.
- Update Account Options: Sets account attributes for the user. Select from the following checkboxes:
  - User must change password at next logon
  - Is Active
  - User cannot change password
  - Password never expires
- Change Password: Use this option to change a user's password.
- Set Property: Use this option to assign a value to a user property, view the current details, and update them.

### Create Group

Adds a new group. Enter the Group Name, Description (optional), and select from the radio buttons for Group Scope and Group Type.

### Modify Group

Modifies or renames a group. Select a User Action from the drop-down menu:

- Rename Group: Use the text fields to rename the group.
- Delete Group: Deletes the group from the Active Directory.
- Add Users to Group: Use the Add and Edit buttons to modify the user list in the Active Directory Object Browser.

If the Active Directory has several users with the same names, select The above names are Logon Names check box to add logon names instead of users.

- Remove Users from Group: Use the Remove button to modify the user list.
- Set Property: Use this option to assign a value to a group property, view the current details, and update them.

### Create Object

Creates a new object for the computer or the organizational unit.

## Modify Object

Modifies an object in the Active Directory. Select a User Action from the drop-down menu:

- Rename Object: Renames an existing computer or organizational unit.
- Delete Object: Deletes an existing computer or organizational unit.
- Move Object: Changes the location of an existing computer or organizational unit.
- Set Property: Assigns a value to an object property.

## Search

Searches the Active Directory for users of a group, or runs a query, and assigns the results to a variable.

Select a Search Action from the drop-down menu:

- Get All Users of a group: Use this option to find all users that are members of a group, and stores them in a list variable. Depending on the return type of the list variable, it contains the user names or the LDAP paths for the members.
- Query: Use this option to specify an Active Directory query and run it. The query results are stored in a list variable, either for object names or LDAP paths, depending on the option selected.

## Get Property

Retrieves a specific property value for an object, and assigns the results to a variable. Select an Object Type from the drop-down menu:

- User
- Group
- Computer
- Organizational Unit

**Tip:** In the above mentioned commands, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- [Creating a New User](#)

Creates new user in the Active Directory.

- [Modifying a User](#)

This command enables you to modify or rename users in the Active Directory.

## Related reference

[Printer Settings command](#)

[Services command](#)

[SNMP command](#)

## Related information

<https://docs.microsoft.com/en-us/exchange/>

## Creating a New User

Creates new user in the Active Directory.

This command creates a new user in the location specified in the Active Directory connection string. Follow these steps:

## Procedure

1. Double-click or drag the Active Directory - Create User command to the Task Actions List pane. The Active Directory main window is displayed.
2. Click Browse to specify the Parent path.
3. Provide the Login User name and Login Password or press the F2 key to insert a Credential Variable.
4. Enter the details for a new user.
5. Check the password option check boxes as needed.
6. Click Save.

Related reference

[Active Directory command](#)

Related information

[Credential variables](#)

## Modifying a User

This command enables you to modify or rename users in the Active Directory.

Follow these steps to insert the Active Directory - Modify User command.

## Procedure

1. Double-click or drag the Active Directory - Modify User command to the Task Actions List pane. The Active Directory main window is displayed.
2. Select one of the options in the Select User Action drop-down menu.
  - Rename User: Use the check boxes in the Enter Modify User Details to rename the user logon name and/or the user account name.
  - Enable User Account: Enables a user account.
  - Disable User Account: Disables a user account. Select the User Name or Logon Name to disable either one, in the Enter Modify User Details section.
  - Delete User: Deletes the user from the Active Directory. Select the User Name or Logon Name to delete either one, in the Enter Modify User Details section.
  - Update User Details: Use this option to update the user's details.
  - Update Account Options: Use this option to set account attributes for the user. Select from four attributes:
    - User must change password at next login
    - Is Active
    - User cannot change password
    - Password never expires
  - Change Password: Use this option to change a user's password.
  - Set Property: Use this option to assign a value to a user property , view the current details and update them.
3. Enter the User Name.  
Tip: If unsure of the User Name to be modified, click Browse in 'Enter LDAP Path' section. You will be guided to the Active Directory Object Browser; select a user from the list to perform any of the above User Actions.

## App Integration command

Use this command to integrate applications with an automated task and capture text data.

### Overview

The App Integration command is based on legacy technology and it might have certain limitations on specific applications. To seamlessly obtain data from applications / screens, it is recommended that you use other tools such as [Object Cloning command](#) and MetaBots.

The App Integration command supports the following technologies:

- Browsers, such as Microsoft Internet Explorer and Mozilla Firefox
- DOS Command Prompt
- Java Applet
- Java Application
- Telnet Unix Shell
- Windows Application
- Other

Capture objects using the following options:

Capture Window: Specify an application window title. When running the task, Automation Anywhere will capture the window as an image.

Capture Area: Specify a specific area of an application window to capture.

Capture Scrollable Text: Specify an area with scrollable text to capture all of the text in that area.

- Use this to capture scrollable text that you cannot normally copy from documents, for example PDFs.
- You can also specify that you want to trim the captured text to remove leading and trailing spaces.

Note: Non-standard Windows controls are supported.

When Secure Recording Mode is enabled:

Images are not captured.

Related reference

[Database command](#)

[Email Automation command](#)

[Excel command](#)

[OCR Command](#)

[PDF integration command](#)

[Read from CSV/Text command](#)

[Terminal Emulator command](#)

[XML command](#)

## Citrix Automation

Citrix Automation command enables you to automate tasks remotely for the application available on a Citrix environment.

Automation Anywhere Enterprise uses Citrix Receiver to automate tasks on a Citrix environment. Citrix Receiver allows you to access applications in a Citrix environment remotely to automate a process.

Automation Anywhere Enterprise uses OCR and image recognition to record and capture actions performed in a Citrix environment. You can capture actions such as mouse clicks, mouse movement, and keystrokes.

**11.3.3** You can use the auto login feature to log in to a Citrix environment when it is locked or logged off. The auto login does not work if you disconnect the Citrix Receiver with the Citrix XenApp desktop without logging off.

Note: **11.3.3** The Enterprise client is now Citrix Ready certified. See [Citrix Ready Marketplace](#).

## Prerequisites

Before you begin automating tasks in a Citrix environment, you must ensure that:

- Citrix Receiver version 14.4.1000 or earlier must be installed on the machine.  
Note: Citrix Receiver must be installed before installing Enterprise client. If you have installed Enterprise client before installing Citrix Receiver, you must uninstall Enterprise client and reinstall after installing Citrix Receiver.
- Credentials to access the Citrix machine must be available.
- Appropriate license for Citrix must be available for the Automation Anywhere Enterprise system.
- Port 1494 must be open for communication with the Citrix machine.

## Components of Citrix Automation

There are two components involved in automating a task in a Citrix environment. These elements are:

- Session Manager
  - Automation Viewer
- [Session Manager](#)  
Session manager enables you to connect to a new or an existing Citrix session for automating a task.
- [Citrix Viewer](#)  
Citrix viewer is an interface that allows you to access applications on a Citrix environment remotely to automate a task.

### Session Manager

Session manager enables you to connect to a new or an existing Citrix session for automating a task.

A session stores information about applications, files, navigations, and other entities used by a task. Session also ensures that the entities of the current tasks are not available for other tasks when the current task is executed. Enterprise client allows the bot developer to create a new session or use an existing Citrix session using the Connect command

Use the same session name to update the actions you have captured earlier or add new actions. For example, you have used Extract Employee Information as session name to capture actions to add information about new employees in the abc.csv file. You can use the same session name to add the actions to extract address information of employees from the abc.csv file.

- [Using session manager](#)

Using the session manager must be the first action while automating a task in a Citrix environment.

Related tasks

[Using session manager](#)

## Using session manager

Using the session manager must be the first action while automating a task in a Citrix environment.

### Prerequisites

Ensure that all the prerequisites mentioned in the [Citrix Automation](#) are met.

To connect to a new or existing Citrix session:

### Procedure

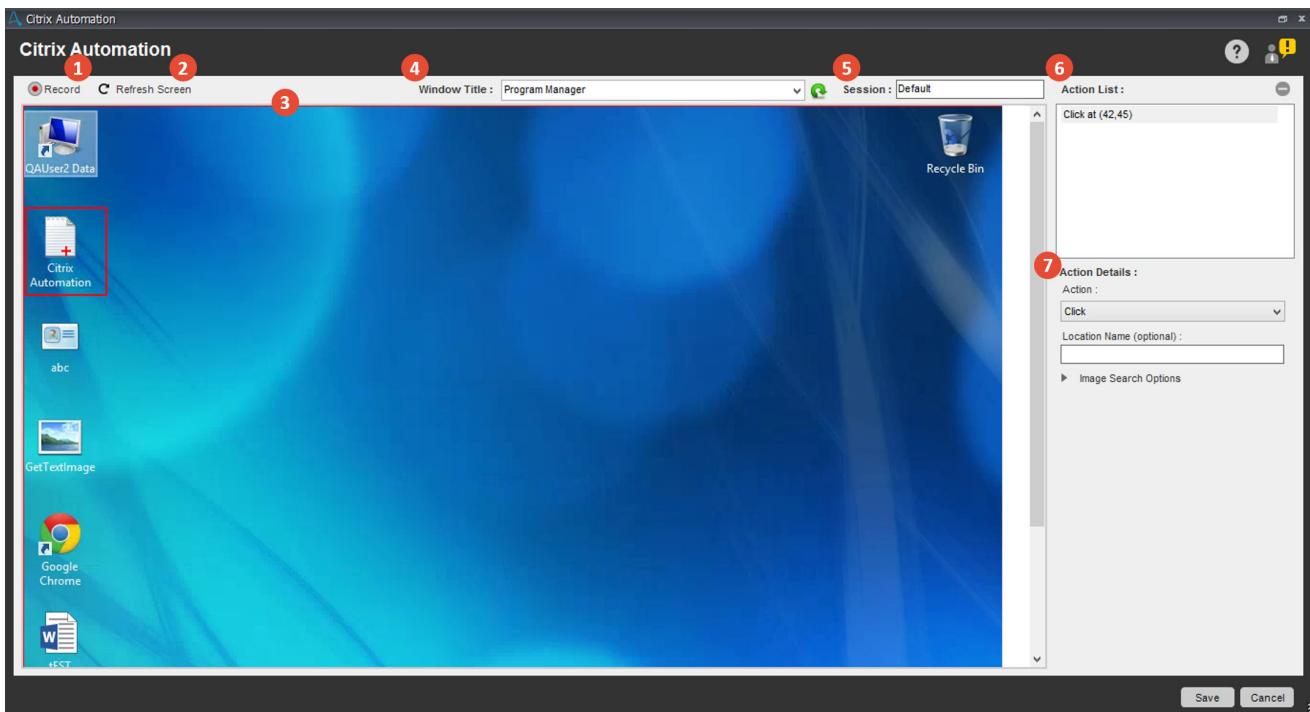
1. Open and log in to Enterprise client.
2. Click New on the toolbar, and then select Workbench from the Automate dialog box.
3. Double-click the Citrix Automation command.  
The Session Manager dialog box appears.
4. Select an option to specify whether you want to create a new session or connect to an existing session. Following options are available:
  - Connect to an existing session
  - Connect to a new session
5. Type a name in the Session Name field.
6. Enter server and domain details in the Server and Domain field respectively.
7. Enter the credentials to be used to establish the connection in the Username and Password fields, and then click Connect.  
The Citrix Viewer appears.

Note: You can press F2 to use credential variables for enhanced security.

### Citrix Viewer

Citrix viewer is an interface that allows you to access applications on a Citrix environment remotely to automate a task.

The Citrix Viewer allows you to record actions as you perform them and edit the configuration for these actions without exiting the viewer.



1	Use this option to record actions you perform in a Citrix viewer.
2	Use this option to refresh the Citrix viewer window to reflect the current changes.
3	Use this area to perform actions that you want to record.
4	Use this option to activate an application window.
5	Use this option to view the name of the current session.
6	Use this option to view the recorded actions.
7	Use this option to view details of an action such as action performed, location, and options for image search and text search based on the action performed

- [Automating task using citrix viewer](#)

Citrix Viewer enables you to record all actions you perform to automate a task.

- [Editing Citrix click action](#)

The click action allows you to perform left-click, right-click, and double-click in an automation task.

- [Editing Citrix get text action](#)

The get text action allows you to extract text in an automation task.

- [Editing Citrix wait action](#)

The wait action allows you to insert delays between actions that are performed in an automation task.

You use the wait action to halt the next action being performed in a task until a window appears or disappears.

## Automating task using citrix viewer

Citrix Viewer enables you to record all actions you perform to automate a task.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Citrix Automation](#) are met.

This task enables you to automate a task using a Citrix Viewer.

## Procedure

1. Open the Citrix Automation Viewer using the Session Manager. See, [Using session manager](#).
2. Select the application window name from the Window Title list to activate that window. The application window name is available in the list only if the application is open.

Note: Windows that does not have a title are displayed as 'Window1', 'Window2', and so on.  
Or,

Open the application on which you want to perform actions.

3. Click Record and do the actions you want to record.
4. Click Stop after you have finished recording the required actions.

The system populates the actions you have performed in the Actions List section. Actions listed can be of the following type:

- Click: This action type represents left-click, right-click, and double-click actions.
- Type: This action type represents actions that you have performed to insert text.
- Get text: This action type represents actions that you have performed to extract text.
- Wait: This action type represents actions that you have performed to insert delay.

5. You can select an action from the Actions List section and click  to delete that action.
6. Click Save.

The recorded actions are saved as separate commands in the Workbench.

## Editing Citrix click action

The click action allows you to perform left-click, right-click, and double-click in an automation task.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Citrix Automation](#) are met.

To edit a Citrix click action:

## Procedure

1. Open the Citrix automation task you want to edit.
  2. Select the click action you want to edit from the Action List section.
- The Action Details dialog box appears.
3. You can specify a name for the control or location in the Location Name field.
  4. You can use the Match slider to specify the match percentage.

Or,

Type the match percentage in the Match field.

5. You can use the Tolerance slider to specify the tolerance percentage.  
Or,

Type the tolerance percentage in the Tolerance field.

See, [Image Recognition Command](#).

6. Fill in the fields on the form, as appropriate.

Table 1.

Name	Description
Subheader	

## Editing Citrix get text action

The get text action allows you to extract text in an automation task.

### Prerequisites

Ensure that all the prerequisites mentioned in the [Citrix Automation](#) are met.

To edit a get text action:

### Procedure

1. Open the Citrix automation task you want to edit.
2. Select the click action you want to edit from the Action List section.  
The Action Details dialog box appears.
3. You can select a variable from the Assign to Variable list, to assign the extracted text to that variable.
4. You can specify a name for the control or location in the Location Name field.
5. You can select an option from the OCR Engine list, to specify the OCR engine you want to use to extract text.
6. You can use the Threshold slider to specify the threshold percentage.  
Or,

Type the threshold percentage in the Threshold field.

7. You can click the View Captured Text option, to view a preview of the extracted text.  
The extracted is displayed in the field below the View Captured Text option.

## Editing Citrix wait action

The wait action allows you to insert delays between actions that are performed in an automation task. You use the wait action to halt the next action being performed in a task until a window appears or disappears.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Citrix Automation](#) are met.

To edit a wait action:

## Procedure

1. Open the Citrix automation task you want to edit.
2. Select the click action you want to edit from the Action List section.  
The Action Details dialog box appears.
3. You can select the Appear or Disappear option in the Wait for selected image to section, to specify whether you want to insert delay until a specific image appears or disappear.
4. You can specify the longest time you want to wait in the Maximum wait time field.
5. You can specify a name for the control or location in the Location Name field.
6. You can use the Match slider to specify the match percentage.

Or,

Type the match percentage in the Match field.

7. You can use the Tolerance slider to specify the tolerance percentage.

Or,

Type the tolerance percentage in the Tolerance field.

## Clipboard command

Use the Clipboard command to automate Windows clipboard activities.

### Clear Clipboard

Clears the contents of the Clipboard.

### Assign to Clipboard

Assigns a variable from the drop-down menu to the Clipboard.

### Assign from Clipboard

Assigns the value in the Clipboard to a variable from the drop-down menu.

### Related concepts

[User defined variables](#)

[System Variables](#)

## Comment command

Use this command to insert comments in your automation tasks to provide additional information about the TaskBot / MetaBot Logic.

## Overview

The Comment command is useful for annotating Logic steps. Comments are ignored when the Logic runs. Some people use comments to extensively document Logic details, whereas others use just a few comments as reminders.

A comment is displayed in green in the Task Actions List, and is always saved as a single line. Multiple-line comments are displayed as a single line when the comment is saved.

## Database command

Use the Database command to convert, export, import, or transfer data between a database and other applications.

Microsoft Access 2007 and Access 2010 users must use Microsoft Office 12.0 Access Database Engine OLE DB Provider.

### Connect

Connects to a database.

### Disconnect

Disconnects from a database.

### SQL Query

Issues SQL queries.

Tip: If using wild cards when executing SQL queries, insert

\*

if using MSAccess or

%

in MSSQL.

Optional:

- Specify the number of records to fetch.
- Specify a time-out value for the query.
- Export the data file as a CSV (comma-separated) file in a specific location. Exporting data to CSV files supports ANSI, Unicode, and UTF-8 encoding.

### Insert/Update/Delete

Specifies an Insert, Update, or Delete operation.

### Run Stored Procedure

Runs an existing procedure that is stored in the database.

Add Parameters: Mark the check box to add or update a procedure.

From the drop-down menu, select Input, Output, or InputOutput type.

Export Data to CSV: Mark the check box to save a file in a specified location.

Tip: In the above mentioned commands, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- [Connecting to a database](#)

Establish connection to a database.

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Related concepts

[User defined variables](#)

[System Variables](#)

## Connecting to a database

Establish connection to a database.

To connect to a database:

### Procedure

1. Type the session name.
2. To complete the connection string, click Browse to show the Data Link Properties window.
3. Select the database provider and type the full path of the data source.
4. To ensure the database connection is working, click Test Connection.
5. To enhance security, press the F2 key to insert a Credential Variable.
6. Click Save.

Related information

[Credential variables](#)

## Delay/Wait command

Use the Delay/Wait command to add a timed delay or a wait condition to TaskBot/MetaBot Logic.

### Delay

Delays the next step in the TaskBot/MetaBot Logic.

- Specify whether to delay for a specific time period or for a randomized time period based on a range.
- Specify milliseconds or seconds.

### Wait for window

Adds a condition to wait for the contents of a screen (or an area in the application) to change before doing the next set of actions.

- Specify whether to wait for the window to open or close.
- From the drop-down menu, select the window.  
Note: If the window is active but does not appear in the drop-down menu, click Refresh.
- Specify the number of seconds to wait for the condition to become true.
- Specify the action to take if the condition is not satisfied:
  - Continue with the next action.
  - Stop the Task.

### Wait for screen change

Adds a condition to wait until a rectangular shape on the screen changes before doing the next action:

- Specify whether the change is for a Window or Screen.
- From the drop-down menu, select the window or screen.
- Click Capture to identify the image to use for the comparison.

- Specify the number of seconds to compare the screen.
- Specify the action to take if the condition is not satisfied:
  - Continue with the next action.
  - Stop the Task.

When Secure Recording Mode is enabled:

Images are not captured.

Related concepts

[System Variables](#)

Related reference

[Pause command](#)

[Stop Task command](#)

## Email Automation command

Use the Email Automation command to automate tasks for the mail server and incoming messages.

Email Automation command enables you to automate mail server operations and handle incoming email messages. You can automate the following tasks:

- Manage incoming email messages and download attachments to specific folders.
- Clear unwanted email messages.
- Communicate with the mail server and monitor email activity.
- Extract email data (Subject, Message, From:, To: , CC:, and attachments) to applications (Excel, Word, Notepad, and others) or to folders on your computer.
- Select either IMAP or POP3 servers.
- Organize email messages based on status (All, Read, and Unread).
- Select either HTML or Plain text formats for email messages.

Do the following operations using the Email Automation command:

### Get All Messages

Downloads all, read, or unread email messages and attachments from the mail server to a specified folder on your computer.

- Attachments are downloaded automatically. It is not optional.
- Starting with Version 11.3.1, you can download attachments with a filename that includes special characters, except for quotation marks ("").
- **11.3.2** Starting with Version 11.3.2, you can download attachments where the filename is in Korean.

By default, the most recently downloaded files overwrite older files. To ensure that all downloaded files are available, clear the Overwrite File(s) check box located at the bottom-right of the window.

Note: Configure the email server to have sufficient time-out so that you are not logged out when the task is running.

### Delete All Messages

Deletes all email messages from the mail server.

### Delete Message

Deletes the most recent email message from the Inbox. Use together with a LOOP command to delete emails one by one based on conditions.

Tip: In the above mentioned commands, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- [Insert an Email Automation command](#)

Automate a mail server or email message task by inserting an Email Automation command.

Related tasks

[Send Email command](#)

[Email Settings](#)

Related information

[Email System Variables](#)

## Insert an Email Automation command

Automate a mail server or email message task by inserting an Email Automation command.

To insert an Email Automation do the following:

## Procedure

1. Double-click or drag one of the Email Automation commands to the Task Actions List pane. The Email Automation window opens.
2. In the Email Server Details fields, specify the email server information. Provide a host name, username, and password.
3. To enhance security, press the F2 key to insert a Credential Variable.
4. Select a server type (IMAP or POP3).
5. Select an email status (All, Read, or Unread).
6. Select a download message format (HTML or plain text).
7. Optional: Specify the location for downloading the email data.
8. Click Save.

Related reference

[Email Automation command](#)

Related information

[Credential variables](#)

## Error Handling command

Use the Error Handling command to aid in debugging when running the TaskBot / MetaBot Logic.

### Begin Error Handling

Specifies whether to continue or stop if an error occurs in the Task and sets Task Status, depending on the error handling action.

- Take Snapshot: If an error occurs, takes a snapshot of the screen and optionally saves it to a file.
- Run Task: Runs another Task Logic when the current Task Logic encounters an error.  
Note: Use the variable \$AAApplicationPath\$ in the Select Task field, to avoid task failure when the Task is deployed from the Enterprise Control Room.
- Log data into file: Logs the error into a new file or appends it to an existing file.
  - Users can log the error line number and description using the system variables \$Error Line Number\$ and \$Error Description\$.

- Select the encoding type: ANSI (default), Unicode, or UTF-8.  
Note: If appending data to an existing file, ensure the selected encoding type matches the encoding type of the file. Otherwise, the data might not log into the file.
- Add Timestamp (optional): Select the check box to add a time stamp to the log file.
- Send Email (optional): Select the check box to send an email for an error with an attached snapshot or a list of the values of all System Variables and User-Defined Variables.
  - Enter sender's and receiver's email address in the From and Email fields respectively.
  - **11.3.3** Enter a Subject for an error email notification. You can also use System Variables and User-defined Variables to define the subject. For example: Use the \$AATaskName\$ variable in the subject to indicate about an error of a specific task.

By default, the Email, From, and Subject fields are populated with the values defined in the Email Notification, see [Email Settings](#). You can also modify the values by adding the System Variables and User-defined Variables using F2 key.

Note: You must enter Email, From, and Subject to configure the Send Email notification.

- Variable Assignment (optional): To assign a value to a variable, select the check box, then press the F2 key.

#### End Error Handling

Closes command.

#### When Secure Recording Mode is enabled:

Images are not captured.

#### Related concepts

[System Variables](#)

#### Related reference

[Using the Variable Manager](#)

#### Related information

[Using Variables](#)

## Excel command

Use this command to transfer data to and from Microsoft Excel spreadsheets.

### Overview

The Excel command is used to automate many of the repetitive tasks that involve spreadsheets. Some common scenarios include:

- Copying data from one Excel spreadsheet to another.
- Extracting data from an application to an Excel spreadsheet.
- Extracting data from a website to an Excel spreadsheet.
- Moving data from an Excel spreadsheet to another application.
- Transfer data from Microsoft Access to Excel.
- Transfer Excel data to a website form.
- Delete rows or columns in Excel.
- Compare two columns or two cells in an Excel spreadsheet.
- Sort data in Excel spreadsheets and delete duplicate rows.

Note: Automation for Excel is supported from Microsoft Office 2000 to Microsoft Office 2016.

**Activate Sheet**

Activates a specific spreadsheet in an open workbook. Specify whether to activate the Sheet by Index (numerical value) or Sheet by Name.

**Close Spreadsheet**

Closes a spreadsheet that was opened using the Open Spreadsheet operation. The Excel command identifies the spreadsheet using the same session name as the one used in the Open Spreadsheet operation.

**Do not save changes:** Mark this check box to discard the spreadsheet.

**Delete Cells**

Deletes the values in an active cell or in a specific cell. The options include:

- Shift cells left
- Shift cells right
- Entire column
- Entire row

**Find/Replace**

Searches spreadsheet for cells that contain a matching value, and optionally replaces cell contents with the new value.

**Customize this command:**

- Specify search parameters with the From and Till drop-down menus. The choices are Beginning of file, End of file, and Active cell.  
Note: Either the From or Till fields can be Active cell, not both.
- Specify whether to search By rows or By columns.
- Mark the check boxes if to Match by case or to only Match entire cell contents.
- Assign value of cell to variable: Select the variable from the drop-down menu.

**Get Cells**

Retrieves the values of the active cell or a specific cell.

**Customize this command:**

- Specify whether to retrieve a single cell, multiple cells, or all cells.
- If Get Single Cell is selected, specify whether to retrieve data from the active cell or a specific cell.
- Store cell contents to: Select the variable from the drop-down menu.

**Go To Cell**

Moves to a specific cell within a spreadsheet.

The movement options include:

- Move one cell to the left or to the right of the active cell.
- Move one cell above or below the active cell.
- Move to the beginning or end of a row or column.

**Note:** End of the row/column refers to the row/column where the data ends.

**Open Spreadsheet**

Opens an Excel spreadsheet based on selected Spreadsheet Path.

**Specific Sheet Name:** Mark this check box if working with multiple spreadsheets to specify the sheet name.

**Contains Header:** Mark this check box to retrieve data from a spreadsheet that contains headings in the first row. Users can enable this option to apply it to later operations in the session.

Load Add-ins: Mark this check box if working with a spreadsheet in which Add-ins are required.

Advanced View:

- Spreadsheet Password: Mark this check box to open a password protected spreadsheet. Specify the password(s) to open and/or modify the spreadsheet.

Press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- Open Read-Only Recommended Spreadsheet: Mark this check box to open a spreadsheet in Read Only or Editable Mode.

#### Run Excel Macro

Runs a macro that is stored within an Excel spreadsheet.

#### Save Spreadsheet

Saves a spreadsheet in an open workbook.

#### Set Cell

Sets the value of the active cell or a specific cell in an Excel spreadsheet. Users can assign a variable to the cell value.

## Contains Headers

Contains Header enables you to retrieve data from the active spreadsheet that has its first row defined as a header.

In cases where the columns change position due to updates (for example, inserting new columns/deleting existing columns), the TaskBot / MetaBot Logic has to be updated to accommodate the change. Use the Contains Header option to enable the TaskBot / MetaBot Logic to automatically map re-positioned columns of the target Excel spreadsheet.

Define the Contains Header option in Open Spreadsheet for a particular session. Use the Excel Cell System Variable when configuring Contains Header.

During play time, the variable will indicate the column name and position of the cell from the header. For example, for a cell defined as A5, the variable will refer to Row A, Column 6.

Note: The string defined in the variable has to be an exact match. For instance, while retrieving data from each cell/specify cells under the heading 'Id', use the System Variable \$Excel Cell(Id,2)\$; variables such as \$Excel Cell(id,2)\$ or \$Excel Cell(<space>Id<space>),2\$ will be considered invalid.

To learn more about the variable, refer [Excel System Variables](#).

It is applicable to the following operations:

- Delete Cell

You cannot delete cells that are defined as header cells.

- Find/Replace

- You can Find a cell value using the Row/Column parameters
- You cannot Replace content in cells that are defined as header cells.

- Get Cells

For the Get Single Cell or Get Multiple Cells parameters, include the Excel Cell variable in the Specific Cell or From Specific Cell and To Specific Cell text boxes .

- Go to Cell

You can apply the Contains Header option to parameter Specific Cell.

- Set Cell
  - You can apply the Contains Header option to parameters Active Cell and Specific Cell.
  - You cannot set the value of a cell that is defined as a header cell.

- **Excel command - Contains Header**

The Contains Header option enables you to configure the command parameters to include or exclude headers.

- [Example: Extracting data from Excel to a web form](#)

Transfer data from the Excel spreadsheet to a web form using the Excel, Loop, Object Cloning, and Web Recorder commands.

Related reference

[Excel System Variables](#)

Related information

[Credential variables](#)

## Excel command - Contains Header

The Contains Header option enables you to configure the command parameters to include or exclude headers.

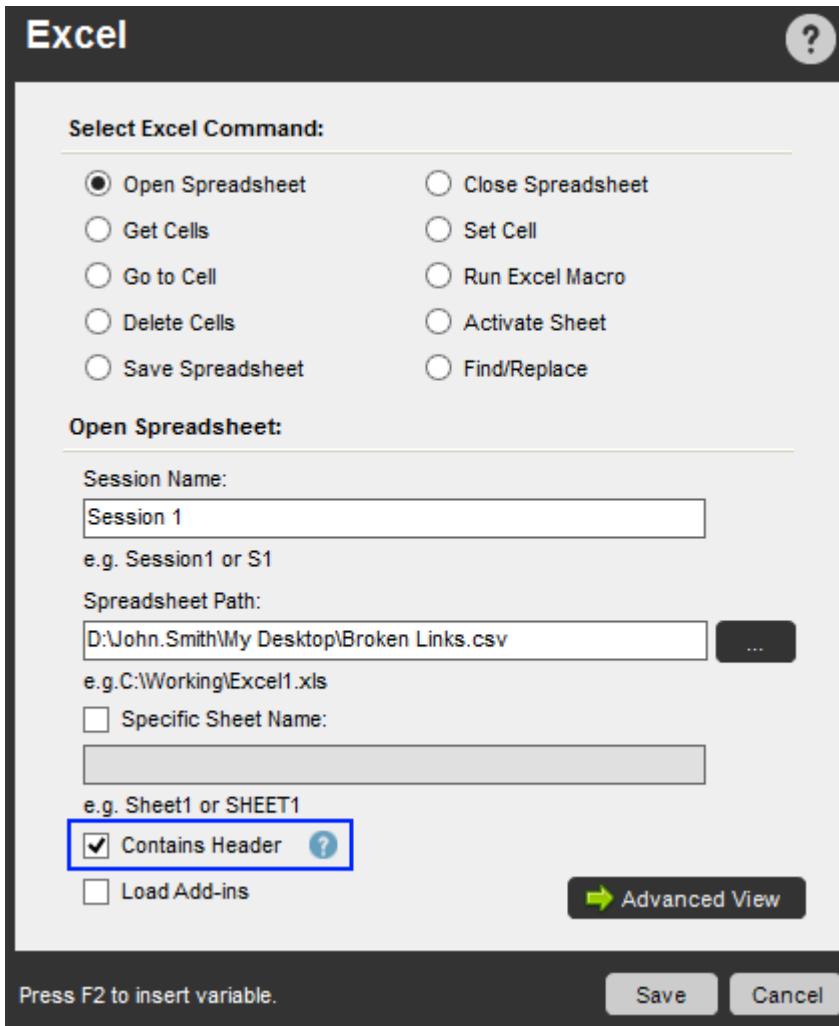
## Overview

When using the Excel command to retrieve data from an Excel spreadsheet that has its first row defined as a heading, you need to specify the rows and columns in a manner that they take those headings into consideration.

## Contains Headers in Excel operations

Contains Header allows you to retrieve/fetch data from the active spreadsheet that has its first row defined as a header. You can define the option in Open Spreadsheet for a particular session. It is applicable to Excel operations Get Cells, Set Cell, Go to Cell, Find/Replace and Delete Cell for that particular session.

Also, in cases where one or more columns of the target Excel spreadsheet change position due to any update (i.e. introducing new columns/deleting existing columns), the corresponding automation TaskBot / MetaBot Logic has to be updated to accommodate the change. Using 'Contains Header' you can enable the TaskBot / MetaBot Logic to automatically map re-positioned columns of the target Excel spreadsheet.



## Excel Cell Variable - a must for Contains Header option

You can use the System Variable - Excel Cell when configuring Contains Header. This variable is exclusive to Contains Header.

Excel			(This category contains Excel related variables.)
Excel Cell	Excel Cell	String	Use in Excel operation like Set Cell, Delete Cells, Go to Cell when contains header option is set to indicate column name and position of the cell from the header or in the column value.
Excel Cell Column	Excel Cell Column	Column	Returns the column of the Excel on which the operation has been performed.
Excel Cell Row	Excel Cell Row	Row	Returns the row of the Excel on which the operation has been performed.

Excel Cell should be used while configuring Excel commands Get Cells, Set Cell, Go to Cell, Find/Replace and Delete Cell. During play time, the variable will indicate the column name and position of the cell from the header. It gives the column reference to the defined cell; e.g cell defined is A5, it will refer to Row A , Column 6, if 'Contains Header' is enabled.

Note: The string defined in the variable has to be an exact match. For instance, while retrieving/fetching data from each cell/specified cells under the heading 'Id', use the System variable \${Excel Cell(Id,2)}; variables such as \${Excel Cell(id,2)} or \${Excel Cell(<space>Id<space>),2} will be considered invalid.

When you use this variable, without configuring the Open Spreadsheet command, the program throws an error during play time - "To enable Excel Cell variable configure Open Spreadsheet command."

To know more about the variable, refer [Excel System Variables](#).

## The where and how of Contains Header

You can apply the Contains Header option for Excel operations:

1. Open Spreadsheet - Contains Header option is controlled from this sub-command as it is configured to the session specified here. Consequent Excel operations will consider the option; whether selected or not for the session specified in this command. Hence, configuring this command is a must.

Reference Points:

- When you open multiple spreadsheets during automation, the program considers the last spreadsheet action. It means that if 'Contains Header' is enabled in Session 1 and not in Session 2, the consequent command will not have Contains Header enabled unless you specify the particular session that has Contains Header (Session 1 in this case).
- In spreadsheets with duplicate header name/content, the program will consider the first occurrence of the header name/content.
- If you include an invalid value or the header row mismatches, the program will throw an error during play time.
- You can input maximum three (3) alphabets for a Column title (e.g. ABC); if you input more than you will encounter an error "Check the value specified in the Column Title. You can input up to 3 alphabets only."

1. Get Cells - For the 'Get Single Cell' or 'Get Multiple Cells' parameters, include the Excel Cell variable in the 'Specific Cell' or 'From Specific Cell' and 'To Specific Cell' text boxes as shown:

In the variable, input the cell heading title. For e.g. if the cell range specified is A5 through A10, define the variable with heading title as given in cell A1; in this case "Id".

Note: n editions earlier to 8.1, Contains Header was applicable and available in Get Cells command only. If you are re-configuring a task that uses that version with 'Contains Header' enabled, it will be "grayed out." It is recommended that you re-configure the command in the task if you want the task to run properly in the current edition.

- Set Cell - You can apply the 'Contains Header' option to parameters Active Cell and Specific Cell when configuring the Set Cell command. If the cell position shifts, values in the specified cells will be set appropriately.

You cannot, however, reset value in the cells if the selected cell, is a header cell. You will encounter the error "The specified cell is part of the header row. You cannot set value in it as 'Contains Header' is enabled." during play time.

You will also not be allowed to set the value of a cell that is defined as a header title. Same is true, if it's in edit mode and the option is enabled.

- Go to Cell - You can Go to a specific or active cell when 'Contains Header' is enabled. All conditions that are applicable during Set Cell are also applicable here.

Note: In Automation Anywhere Excel Command, Active Cell > End of the row/column refers to "end of the row/column of data"; not the end of spreadsheet row/column.

- Delete Cells - When using this command for 'Contains Header', you will not be allowed to delete the cells that have a header title defined i.e. the first row of the spreadsheet. If you have specified a cell that is defined as a header - either by using the active or specific cell parameter, you will encounter the error "The specified cell is part of a header row. You cannot delete it as 'Contains Header' is enabled." during play time.
- Find/Replace -When using this command for 'Contains Header', you will be allowed to Find a cell value by Row/Column but Replace the content in only those cells that are not defined as header titles. If you specify a cell that is defined as a header, you will encounter the error "The specified cell is part of a header row. You cannot replace its value as 'Contains Header' is enabled." during play time.

#### Related reference

[Excel command](#)

[Excel System Variables](#)

#### Example: Extracting data from Excel to a web form

Transfer data from the Excel spreadsheet to a web form using the Excel, Loop, Object Cloning, and Web Recorder commands.

The following steps are a general example of how to automate this task:

#### Procedure

1. Open the web form:
  - a) In the Web Recorder submenu, double-click or drag the Open Browser command.
  - b) Type the URL to Open and click Save.
2. Add a wait time for the browser to open to the web page:
  - a) Double-click or drag the Wait command.
  - b) Select the Wait for windowoption button.
  - c) From the drop-down menu, select the Window.
  - d) Type the wait time and click Save.
3. Open the spreadsheet with the data:
  - a) In the Excel submenu, double-click or drag the Open Spreadsheet command.
  - b) Click Browse to select the Excel file.
  - c) Click Contains Header, then click Save.

This action excludes the header data from the first row.

- d) Double-click or drag the Get Cells command.
  - e) Click Get All Cells and click Save.
4. Create a loop to iterate through each row of the spreadsheet:
    - a) In the Loop submenu, double-click or drag the Each row in an Excel dataset command.
    - b) Click Save.

A comment appears under the `Start Loop` action line.

5. Capture the web form fields as objects to manipulate their contents:
  - a) Double-click or drag the Object Cloning after Comment command.
  - b) From the drop-down menu, select the window.
  - c) Click Capture and hold until the web page appears.
  - d) Position the mouse over the field and then release the mouse.

The Object Cloning window appears.

- e) From the Action To Perform drop-down menu, select Set Text.
- f) Click the Text To Set entry box.
- g) Press F2.

The Insert Variable window appears.

- h) Select Excel Column, and click Insert.

The Excel Column Option window appears.

- i) Type the Column Number, and click OK.
- j) Click Save.

6. Repeat the above steps to capture each web form field as an object and assign it to an Excel column.

7. Automate clicking the Submit button in the web form:

- a) Double-click or drag the Object Cloning after Comment command.
- b) From the drop-down menu, select the window.
- c) Click Capture and hold until the web page appears.
- d) Position the mouse over the Submit button and then release the mouse.

The Object Cloning window appears.

- e) From the Action To Perform drop-down menu, select Left Click.
- f) Click Save.

8. When the Submit button is clicked, the web form sends the data to a server to process and generate a success message. Insert a Delay command to account for the processing time:

- a) Double-click or drag the Delay command.

The Delay window appears.

- b) Select the Regular Delayoption button and set the field to  
5  
seconds.
- c) Click Save.

9. When the web page redirects to the success message, navigate to the web form:

- a) In the Web Recorder submenu, double-click or drag the Navigate URL command.
- b) Type the URL to Open and click Save.

10. Close the browser after the End Loop command and save the Task to end the TaskBot Logic.

- a) Double-click or drag the Close Spreadsheet command and click Save.
- b) Name the Task and click Save.
- c) Click Run.

## Export Dataset command

Use this command to extract large amounts of data from a single source and save it to an external file, such as an Excel spreadsheet.

### Supported Technologies and Controls

The Export Dataset command supports the following technologies:

- HTML
- JAVA
- MSAA
- .NET
- Flex

The Export Dataset command supports the following controls and actions:

- Static Text (label): GetProperty
- Text Box: GetProperty
- Radio Button: GetStatus and GetProperty
- Check Box: GetStatus and GetProperty
- Combo Box: GetProperty, GetTotalItems, GetSelectedIndex, and GetSelectedText
- List: GetProperty, GetTotalItems, GetSelectedIndex, and GetSelectedText
- Buttons: LeftClick

## File and Folder command

Use this command to automate operations that involve manipulating files and folders.

### Overview

The File and Folder command provides an easy way to automate creating, opening, copying, moving, renaming, deleting, and organizing files and folders. The File and Folder command also offers advanced operations for working with files and folders based on their size and date created or modified.

#### Copy Files

Copies an existing file from the source to a specific destination. Select the Overwrite Files/Folders check box to replace existing files with the same name.

#### Rename Files

Renames an existing file.

#### Delete Files

Deletes an existing file.

#### Create File

Creates new file in a specific location. Select the Overwrite Files/Folders check box to replace existing files with the same name.

#### Zip Files

Compress a group of files into a ZIP file.

11.3.2

If you are upgrading from any of the previous 11.x releases to Version 11.3.2, note that the Zip Files command now compresses files directly without including the specified folder in zip file contents, even if both these conditions are met:

- you include a backslash at the end of the file path in the Specify Files to Compress field
- you specify the File Type

If the specified folder is required in zip file contents, then you must remove the backslash from the file path in the Specify Files to Compress field.

#### Unzip Files

Unzips and extracts a group of files that has previously been zipped.

#### Print File

Prints a file.

#### Print Multiple Files

Prints files from a selected folder. Select the Include Subfolder check box to print files from the subfolders.

#### Open File

Opens an existing file.

#### Create File Shortcut

Create a shortcut for a file in a specific location.

#### Copy Folder

Copies an existing folder from the source to a specific destination. Select the Overwrite Files/Folders check box to replace existing folders with the same name.

#### Rename Folder

Renames an existing folder.

#### Delete Folder

Deletes an existing folder.

#### Create Folder

Creates new folder in a specific location. Select the Overwrite Files/Folders check box to replace existing folders with the same name.

#### Open Folder

Opens an existing folder.

#### Create Folder Shortcut

Create a shortcut for a folder in a specific location.

#### Related reference

[Open Program/File command](#)

## FTP / SFTP command

Use this command to automate any FTP or SFTP operations.

FTP (File Transfer Protocol) is a standard network protocol used to transfer files from one host to another host over a TCP-based network, such as the Internet. The FTP/SFTP command can automate the following:

- File uploads and downloads
- Back up websites
- Secure FTP for secure remote file transfer

Note: SFTP with SSH1 protocol is no longer supported by SFTP.

To use this command, ensure that Visual C++ Redistributable for Visual Studio 2015 is installed on the Enterprise client machine. Download the redistributable from Microsoft's website: <https://www.microsoft.com/en-in/download/details.aspx?id=48145>

## Connect

Connects to FTP/SFTP server.

Specify the FTP/SFTP Server name, User Name, and Password.

- You can use variables in FTP Server, User Name, Password, and Port Number fields.

The variable support for the Port Number field is applicable from 11.3.1 onwards.

- To test the connection, type an actual value instead of a variable in all the fields where you have inserted a variable.
- Press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

You can also select any of the following options:

- Anonymous login
- Secure FTP: Select this to use secure FTP. This will also allow you to opt for Key File Authentication.
- Key File Authentication: Select this option, to use a private key file for SFTP connection. Ensure the FTP Server has a corresponding public key file.

Note:

- Not supported: When SFTP is configured on a Windows Server, Key File Authentication and Normal User Authentication connections with the Enterprise client system are not supported.
- Supported: When SFTP is configured on a Unix Server, Key File Authentication and Normal User Authentication connections using the Enterprise client system are supported.

Test the connection to ensure all parameters work.

**Advanced View:** Use this to set advanced connection options. Here, you can specify the number of reconnection attempts, time between each attempt, transfer mode, transfer type, and default directory path.

Note: Transfer Mode, Transfer Type, and Directory options are available only if you are using a FTP connection.

## Disconnect

Terminates the connection to an FTP/SFTP server.

## Put Files

Uploads one or more files from a folder.

## Get Files

Downloads one or more files to a local machine from an FTP/SFTP folder.

The FTP/SFTP command also offers advanced operations for working with files based on the date they are created or modified.

## Put Folder

Uploads an entire folder from a local machine to an FTP/SFTP server.

You can specify filters using wild card characters to restrict uploads to specific types of files.

## Get Folder

Downloads an entire folder from an FTP/SFTP server to a local machine.

You can specify filters using wild card characters to download only specific types of files.

You can also specify folders based on the date they are created or modified.

#### Delete Files

Deletes one or more files from an FTP/SFTP folder.

#### Rename Files

Renames one or more files in an FTP/SFTP folder.

#### Create Folder

Creates a folder on an FTP/SFTP server.

#### Delete Folder

Deletes a folder (including all sub-folders and files within it) from an FTP/SFTP server.

#### Change Folder

Moves to a different folder on an FTP/SFTP server.

Use this option to download or upload files in more than one directory on your FTP/SFTP server.

## IF/ELSE command

Use this command to add conditional logic and actions.

### Overview

The IF/ELSE command performs actions when certain conditions exist. Most of the conditional operations enable users to specify how long to wait for the condition to become true before taking another action.

The IF/Else command offers the following conditions:

#### Application Running / Application Not Running

Performs an action based on whether an application is running / not running. This condition applies if the application is running in the background.

#### File Date

Checks the date and time that a file was created or modified. Specify a time range with the

**hh:mm:ss**

format. Specify a date range using

**between**

or

**before**

keywords, using the

**MM/DD/YY**

format.

#### File Exists / File Does Not Exist

Performs an action based on whether a file exists / does not exist.

#### File Size

Performs an action based on the file size (greater than, smaller than, or equal to).

#### Folder Exists / Folder Does Not Exist

Performs an action based on whether a folder exists / does not exist.

#### Image Recognition

Verifies whether an image exists within another image. A minimum match percentage and comparison mode (Normal, Advanced, Grey-scale, Monochrome) can be specified. This conditional operation can be repeated, using the Repeat if image not found checkbox.

**Object Properties**

Identifies and measures the properties of an object, such as type, size, position, item name, and item value.

Note: When capturing an object, click Capture without releasing and drag the arrow to the object.

**Ping Successful / Ping Unsuccessful**

Performs an action based on whether a machine or server is running or not.

**Script Successful / Script Unsuccessful**

Performs an action based on whether a script ran successfully or not. Use this condition to integrate third-party scripts with TaskBot / MetaBot Logic.

**Service Running / Service Not Running**

Performs an action based on whether a particular service is running.

**Task Successful / Unsuccessful**

Performs an action based on whether a task ran successfully or not. Use this condition to run several TaskBot / MetaBot Logics, ensuring that each task runs only if the previous was successful.

Note: To avoid task failure when the task is deployed from Enterprise Control Room, use the variable \$AAApplicationPath\$, instead of a user-defined variable. If any other variable is used in the Select Task File field, a popup message will ask the user to confirm use of the local / invalid variable.

**Variable**

Adds system variables and operators to Logic.

To include the

**AND**

or

**OR**

conditions in conjunction with the Variable condition, select the Add more conditions option.

Enable the Match Any option for

**OR**

conditions or Match All for

**AND**

conditions.

Note: A single parameter cannot contain both Match Any and Match All.

**Web Control**

Identifies if a specific web control exists on a Web page, such as links, text boxes, and drop-down menus.

Note: This command is used when editing TaskBot / MetaBot Logics that are created using the Web Recorder.

**Windows Control**

Verifies whether a specific control exists in an active window, such as command buttons, list box items, text boxes, or menu tabs.

**Window Exists / Window Does Not Exist**

Performs an action based on whether a window exists / does not exist. Can be used for the following:

- Check or verify that a specific application is open.
- Check whether an error has occurred.
- Check whether a file download has completed.

When Secure Recording Mode is enabled:

Images are not captured.

- [Setting a Wait Time for Conditions](#)

Delays command execution for specified time to wait for a condition to be true.

**Related tasks**

[Setting a Wait Time for Conditions](#)

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## Related reference

[Using Variables with IF-Else and LOOP Commands](#)  
[Web Recorder command](#)  
[Loop command](#)

## Setting a Wait Time for Conditions

Delays command execution for specified time to wait for a condition to be true.

Many of the IF/ELSE commands enable users to specify how long to wait for a condition to become true. If the `How long would you like to wait...?` field is left empty, or a 0 (zero) is entered, the IF/ELSE command will execute immediately. The following commands have a wait time setting:

- File exists
- Folder exists
- Window exists
- Application running
- Ping successful
- File size
- File date
- Web control

To set a wait time for a condition, follow these steps:

## Procedure

1. Select IFand a command.
2. Type the maximum time in seconds to wait for the condition.  
 If the condition is fulfilled within the maximum wait time, the command will execute.  
 If the condition is not fulfilled, the command is skipped and the actions following ENDIF are run.  
 Note: If 'Secure Recording mode' is enabled, images and values are not captured.

## Related tasks

[Inserting an IF/ELSE Command](#)

## Related reference

[IF/ELSE command](#)

[Secure recording mode](#)

## Image Recognition command

Use this command to search for an image within a source image.

## Overview

Use this command to quickly search for an image within a source image and to readily automate any application that uses visual elements. You can capture and process various images of different sizes using HiDPI display.

Another major benefit of using image recognition is to locate an image after the image might be moved, for example, from one location on a web page to another.

Also, in some cases when application UI elements may not be available for automation you can use Image based automation. For example, when application is exposed over Citrix or when application accessed from RDP, or when object detection is not as reliable such as legacy applications, you can use the Image Recognition command.

The Image Recognition command offers the following operations:

#### Wait time

Specify the time in milliseconds to wait for images that are to be captured from windows that might take some time to load.

#### Select Image 1

Capture the image from an open window or select it from a file.

If capturing from an open window, you can also position your click location relative to an image. This is useful when the target image is blurred, has some background noise, or the target image is visible multiple times.

#### Select Image 2

Capture the image from an open window or select it from a file.

- You can also select an easily identifiable image and position your click relative to it.  
Note: you can select the relative click option only if you are using Enterprise client edition 11.0 and higher.
- If using in conjunction with [IF/ELSE command](#), select If the image is found, click on it for the cross-hair to appear.
- To return to the default cross-hair position (center of the image), click Reset Crosshair.

For faster image recognition:

- Ensure Image2 is as small as possible.
- If a particular color dominates the entire screen (say gray), make sure that the starting pixel of Image2 (the one on the upper left corner) doesn't include that color.

#### Image Occurrence

Use this option when the target image can be found multiple times. Here, you can use a variable when you do not know the number of times the image might appear on the screen. While using variables ensure you assign variables that support numeric values

#### Match Percentage

Use this option to specify the acceptable percentage of matching pixels between the two images.

For example, a 20% Match Percentage means that even if up to 80% of pixels mismatch between the two images, the images will be considered matching.

#### Tolerance

Use this option to specify the acceptable range of matching pixels.

A 0% Tolerance means the individual RGB values of the pixels being compared must match, exactly. A 20% Tolerance could allow the individual RGB values of the pixels to vary from + 20% to - 20% for a successful match.

- While Match Percentage defines the extent of overall mismatch allowed between Image1 and Image2, Tolerance defines the extent of mismatch allowed between any two pixels under comparison.
- The RGB color space uses 8 bits each for red, green and blue and can have integer values ranging from 0 to 255.

#### Comparison Mode

Select one of the methods of comparison:

1. Advanced: This is the default selection. It is the most accurate mode as compared to other modes and provides better results in cases where screen resolution/zooming or application scaling is subject to change.  
Note: If you have migrated bots created in Enterprise client 10.x version to the current version, the comparison mode that you had selected will not change to Advanced automatically. Only the bots created in the current version will have Advanced as the default mode of comparison.
2. Normal mode: Compares the RGB components of the pixels with the source. Use this when you are not bothered about the speed and want exact color match in complex scenarios.
3. Gray-scaled mode: Converts pixels to an appropriate level of gray-scale prior to comparing. Use this when colors are of limited benefit in comparison and you want your test to run faster.
4. Monochrome mode with Threshold: Converts pixels to either black or white prior to comparing. The threshold value is used while converting the RGB or Gray-Scaled pixels to either black or white (a pixel value less than the threshold value is black; greater is white). Use this when you want to recognize multi-colored text against multi-colored backgrounds.

## Quick Test

Use the Quick Test button to quickly ascertain the output is as required. This eliminates the need to run the entire test.

- A Quick Test, similar to an actual test, includes the parameters provided for Match Percentage, Tolerance and Comparison Mode.
- If variables are used in the TaskBot / MetaBot Logic, Quick Test will not be applicable.
- For tasks created in earlier versions (prior to 7.5), Quick Test will work only after you recapture the image as this feature is available from version 7.5 onward.
- **11.3.1.1** If you get the error `Unable to load DLL 'Automation.ImageAlgorithm.dll` when you click Quick Test, see [Resolving an Image Recognition command error](#).

When Secure Recording Mode is enabled:

Image1 is not saved and Image2 is not captured.

- [Using the Image Recognition command](#)

Use this command to search for an image within a source image.

- [Resolving an Image Recognition command error](#)

Users can resolve errors resulting due to missing media files on a machine that has a server based operating system during UI automation using Image Recognition command.

## Related tasks

[Resolving an Image Recognition command error](#)

## Related reference

[Error Handling command](#)

[File and Folder command](#)

[IF/ELSE command](#)

[Loop command](#)

[Variable Operation command](#)

## Using the Image Recognition command

Use this command to search for an image within a source image.

To use the Image Recognition command, follow these steps:

## Procedure

1. Double-click or drag the command to the Task Actions List pane.
2. Select the source image file from a folder or capture it from an application window.  
This image can be standalone or contained within another image that is captured dynamically at run time.
3. Select Show Coordinates to capture and view the coordinates of the target image within the window.
4. Specify the wait time (in milliseconds) in the Wait field.
5. Select or capture the image that you want to click upon during play time in Image2.  
You can capture the image from an application window or select it from a File.  
If you are using the command for a window, you also have the flexibility to position your click location relative to an image. This is useful when the target image is blurred, has some background noise, or the target image is visible multiple times.
6. Select Image Occurrence when the target image can be found multiple times.  
You can insert a variable when you do not know the number of times the image might appear on the screen. Ensure you assign variables that support numeric values.
7. Select a click option:
  - Left Click
  - Double-Click
  - Right Click
8. Specify match percentage and tolerance.
9. Select one of the methods of comparison.
  - Advanced
  - Normal
  - Gray-scale
  - Monochrome with threshold
10. Optionally, select the Quick Test button to see the output without running the entire test.
11. Click Save.

## Resolving an Image Recognition command error

Users can resolve errors resulting due to missing media files on a machine that has a server based operating system during UI automation using Image Recognition command.

On clicking Quick Test in Image Recognition command, the error message `Unable to load DLL Automation.ImageAlgorithm.dll` displays if the media files are either not installed or disabled on a machine that has a server based operating system. To select/enable the media files follow the procedure described below:

## Procedure

1. Go to the Server Manager.
2. Click Add Roles and Features.  
The Add Roles and Features Wizard is displayed.
3. From the Features tab, select the check box for Media Foundation.  
Note: Media Foundation must be selected manually because media files and updates are not installed automatically in machines that have server based Operating Systems.
4. Click Install.
5. Restart the machine for the changes to take effect.

## Import DataSet command

Use this command to insert huge amounts of data from a single source.

You can insert data into various fields from an external file such as an Excel spreadsheet using single command. It enables you to create logic that would otherwise involve numerous keystrokes and clicks.

## Supported Technologies and Controls

Import Dataset command supports the following technologies:

1. HTML
2. JAVA
3. MSAA
4. .NET
5. Flex

Import Dataset command supports the following controls and actions:

1. Static Text (label) - GetProperty, Click, LeftClick, RightClick, and DoubleClick
2. Text Box - SetText, AppendText, Click, LeftClick, RightClick, and DoubleClick
3. Radio Button - Select, LeftClick, RightClick, and DoubleClick
4. Check Box - Check, Uncheck, Toggle, LeftClick, RightClick, and DoubleClick
5. Combo Box - SelectItemByText, SelectItemByIndex, LeftClick, RightClick, DoubleClick, and Expand
6. List View - SelectItemByText, SelectItemByIndex, LeftClick, RightClick, and DoubleClick
7. Buttons - LeftClick

## Import Data to an application

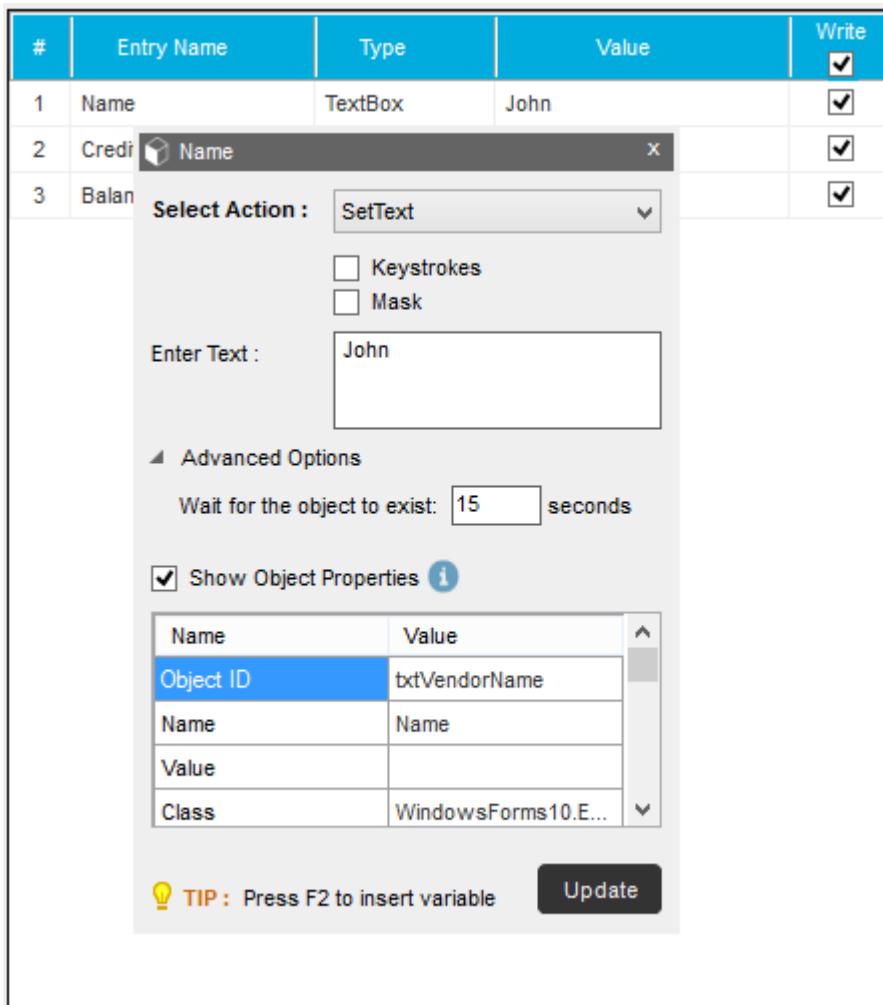
You can configure the Import Dataset command from Workbench → Commands.

1. Create a Screen using required application.
2. Configure the Screen for required parameters. [Object properties configuration](#)  
Tip: If an object does not display or displays an unidentifiable text and/or number, its recommended you provide an alias to that object during Screen configuration.
3. In the Logic Editor, select Import Dataset from the Commands list.
4. Start filling in details using a combination of variables, text and controls. Unless a field is populated, you cannot move to the next.

Note: All the objects which are not selected for automation execution are disabled by default. To enter value in those, click on the check-box in Write column.

- You can use either the direct assignment of variable i.e. assign a Value or indirect assignment i.e. assign value from a text document as shown:
  - For variables that make use of credentials or any sensitive data, use Credential Variables. Select the required variable listed under \$CredentialVariables\$ from Insert Variables. Refer the article [Assigning Credential Variables](#) for details.

- You can choose to create a variable, if not present when inserting one. In the Value field, press function key F2 to launch Insert Variable dialog. Click New to create a variable.
- You can also insert object values using the properties window. To configure additional properties such as delay, search criteria etc, double click anywhere on the corresponding object row and update the properties.



- Select Action that needs to be performed during Logic execution. This can be changed if required.
  - Optionally Insert Keystrokes and/or Mask the keystrokes
  - Type the required text in Enter Text
  - In Advanced Options specify:
    - Wait time for the object to exist. This can be changed if required.
    - Optionally view the Object Properties which will be used to execute the command
    - Save or Update if in edit mode.
- By default, all fields are displayed. Once you select fields for inserting values, and you open in edit mode after saving only those are shown. To view all click Show All.
  - You can also choose to change the sequence in which the object values will be filled when automation is executed. For this you must click . This is the default state. To lock the sequence, click . This ensures the sequence is not changed.

- The data that is visible can be filtered on Type and sorted on Type and Entry columns.

5. Your logic will reflect the Import Dataset command in the event data.

6. Save.

Tip: The Save button is disabled until all object values that are selected for Write are filled.

It is a best practice to Calibrate Screens that are used for Import Dataset command if the application is subject to frequent updates. These would affect the MetaBot during execution.

Note: You can fill the form in OCR mode, IR mode and mixed mode.

## Internet Connection command

Use this command to automatically connect to the Internet using a dial-up connection.

Connect

Establishes dial-up connection.

- Specify a connection from the drop-down list.
- Specify what to do if the connection fails.
  - Mark the check box to reconnect.
  - Specify the number of attempts from the drop-down list.
  - Specify the time in seconds between attempts from the drop-down list.

Disconnect

Ends the dial-up connection.

Related tasks

[Launch Website command](#)

[Send Email command](#)

Related reference

[FTP / SFTP command](#)

## Insert Keystrokes command

Use this command to automate the typing of keystrokes in English, German, French, Italian, or Spanish characters.

Select Window drop-down list

Select the title of the application in which you want to type keystrokes.

- If the window is running but does not appear in the list, click Refresh
- Applications that you have already referenced in the TaskBot / MetaBot Logic are listed at the top of the drop-down list. Applications that are currently open are listed below the dotted line.

For applications that change titles:

If the name of the application window title changes over time, insert a wild card character (\*) at the start or end of the window title. This ensures that the application is consistently found when running the Logic.

For example, to ensure the Microsoft Excel application is always found, use 'Microsoft Excel\*' or '\*Excel\*' or '\*Excel\*'.  
Keystrokes text box

Type or Copy-Paste the text.

To insert special keystrokes such as Control, Shift, or Tab, select the button below Special Keystrokes.

For example, if you want the TaskBot / MetaBot Logic to type Ctrl + C in an application, click Ctrl Down, type C, then click Ctrl Up. The Keystrokes window will display: [CTRL DOWN] c [CTRL UP].

#### Keystroke Encryption check box

Select the check box to prevent your TaskBot / MetaBot Logics from being altered by unauthorized users. This option hides sensitive information or passwords that are typed using the Keystrokes command

#### Add a delay

The default delay is 0 (Zero) milliseconds.

## Launch Website command

Use this command to launch a website.

Follow these steps:

### Procedure

1. Double-click or drag the Launch Website command.  
The Launch Website window appears.
2. Specify the URL of the website to launch.
3. Optional: 11.3.2 Select the Override default browser option and choose the browser from the drop-down list to override the default browser setting of your system.  
The supported browsers available for selection are Google Chrome, Internet Explorer, and Microsoft Edge.  
The default browser shown in the list is your system default browser.  
Note: If you choose Internet Explorer as the Override default browser that is not installed on your system, then the website will be launched using the system default browser. But if you choose a browser other than Internet Explorer, then the same does not apply and an error message is shown.
4. Optional: Select the checkboxes to open the URL in the existing Internet Explorer window or in a new tab.  
Tip: 11.3.2 This option is available for selection only if you select Internet Explorer browser as Override default browser.
5. Click Launch to verify the URL.
6. Click Save.

#### Related tasks

[Send Email command](#)

[Email Settings](#)

#### Related reference

[FTP / SFTP command](#)

[Using the Web Recorder](#)

[Web Recorder command](#)

## Log-to-File command

Use this command to create a log file with data about the events that occur while TaskBot / MetaBot Logic runs.

### Overview

Automation Anywhere provides an easy way for users to create a log file with data about the events that occur while TaskBot/ MetaBot Logic runs. The Log-to-File command enables users to

- Verify that a TaskBot / MetaBot Logic has run properly.
- Create a new log file if one does not already exist.
- 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.

Log files can be saved in the several file formats, including .csv and .txt files.

Log files can be encoded into ANSI, Unicode, and UTF8.

#### Related tasks

[Launch Website command](#)

[Send Email command](#)

#### Related reference

[FTP / SFTP command](#)

[Using the Web Recorder](#)

[Web Recorder command](#)

## Loop command

Use this command to repeat a sequence of commands.

### Start Loop

Starts the loop. Select from the following options:

- Times: loops for a number of times.
- List: loops through a list.
- Condition: runs actions based on an existing condition.

Optionally, add a Wait time for the condition to become true.

- Each Row in an Excel Dataset: used in conjunction with the Get Multiple Cells operation of the Excel command. When you have retrieved a range of cells from Excel, the rows and columns of the range are stored in the system variable \$Excel Column\$.
- Each Row in an Internet Explorer Table: used in conjunction with the Extract Table operation of the Web Recorder command. When you extract a table by using the Web Recorder Extract Table command, the rows and columns of the table are stored in the system variable \$Table Column\$.
- Each Row in an SQL Query Dataset: used in conjunction with Database commands. When you issue an SQL query using the Database SQL Query command, the result set for the SQL query is stored in the system variable \$Dataset Column\$.
- Each File in a Folder: used to perform an action on all files in a folder.

You can obtain information about the files and folder by using the following system variables:

- \$FileName\$ - Use this variable to obtain the name of a file.
- \$Extension\$ - Use this variable to obtain a file's extension.
- \$CurrentDirectory\$ - Use this variable to obtain the path of the folder in which the files are stored.

All of these system variables return an empty value when used outside the looping command.

- Each Folder in a Folder: used to perform an action on one or more folders. To access the folder name within the loop, use the system variable \$FolderName\$.
- Each Row in a CSV/Text File: used to loop through each row in a CSV or text file.
- Each Email Message on Server: used to perform an action on each message that resides on your mail server. You might use this command to save mail attributes, such as Subject, Message, To:, Cc:, and Attachment.
- Each Node in an XML Dataset: used to loop through each node of an XML data set to obtain values from multiple nodes.

#### End Loop

Ends the loop. The actions that exist between the Start Loop and End Loop commands will repeat based on the type of loop you have selected.

Whenever you insert a Start Loop command, an End Loop command is also inserted. If the End Loop is mistakenly deleted, you can insert a new one.

#### Exit Loop

Breaks out from a loop when a particular action or condition occurs. The Exit Loop command can exist only between the Start Loop and End Loop commands.

#### Continue

Continues the next iteration of a loop when a particular action or condition occurs. When a Continue Loop command is reached, the commands up to End Loop are skipped and the next iteration of the loop is run.

#### Related reference

[IF/ELSE command](#)

[Using Variables with IF-Else and LOOP Commands](#)

## Manage Window Controls command

Use this command to capture Windows control properties, such as buttons, list box items, text boxes, menu tabs, combo boxes, check boxes, and tables. You can perform actions with these controls or assign the captured properties to variables. You can also use this command to simultaneously record actions that you perform.

#### Control Properties

The controls that are captured are displayed under Control Properties, which show the Control Type, Name, Value and its Location (coordinates).

Automation Anywhere can perform actions that use only standard Windows controls. If your application contains customized controls, Automation Anywhere might not be able to capture them.

This command supports the following capture controls:

Enable Capture a control... and select one of the controls below from the drop down list. This option helps to avoid errors that occur when clicking on certain controls that possess different attributes.

- Check box - Set Check Box Status, Get Check Box Status
- Command Button - Click, Get Text
- Drop Down - Get Total Items, Get Selected Index, Get Selected Item, Select Item by Index, Select Item by Text
- Get Text - Click on link, Get Name of All Children, Get Value of All Children, Get Value Text, Get Name Text
- List Item/List Box - Get Total Items, Get Selected Index, Get Selected Item, Select Item by Index, Select Item by Text
- Menu/Menu Bar/Menu Item - Get Total Items, Get Text by Index, Get Index by Text, Click Item By Index, Click Item by Text
- Radio Button - Get Radio Button Status, Select Radio Button
- Tab/Tab Item - Get Total Items, Get Selected Index, Get Selected Item, Select Tab By Index, Select Tab by Text
- Table - Exports To CSV, Get Cell By Index, Get Cell By Text, Total Row, Total Column, Set Cell By Index, Set Cell By Text
- Text Box - Get Text, Set Text, Append Text, Click On Link
- Tree/Tree Item - Get Total Items, Get Selected Index, Get Selected Item, Select Item By Index, Select Item by Text

The following actions are available for all controls:

- Get Name Text
- Get Value Text
- Click on Link
- Get Name of All Children
- Get Value of All Children
- Left mouse click
- Right mouse click
- Double-click

## Capturing Web Controls

To capture web controls, be sure to use the Manage Web Controls sub-command in Web Recorder Command, as opposed to the Manage Windows Controls command. Internet Explorer controls are recognized by the Manage Web Controls command.

When Secure Recording Mode is enabled:

No values are captured.

Related reference

[Log-to-File command](#)

[Windows Actions command](#)

## Message Box command

Use this command to insert a message box that will display a message when the Task runs.

### Overview

Message boxes are useful for issuing a message to the user whenever the TaskBot / MetaBot Logic concludes running. For example, a user can insert a Message Box command to follow Web Form Task Logic, so the command issues a message that states `Web Form Filled` and `Complete`.

Users can specify the following components in a message box:

#### Caption

Enter a caption name for the message box.

#### Message

Enter a message in the dialog box.

#### Scroll bar

Insert a scroll bar in the message. The minimum message length for a scroll bar to be displayed is 10 lines.

#### Close Message Box

Enter the seconds value after which the message box should close.

#### Related reference

[Prompt command](#)

## Mouse command

Use this command to add mouse clicks to the Logic.

#### Click

Automates mouse clicks.

Select the window from the drop-down list. If the application is running but not visible, click Refresh.

- Select the mouse button to click: Left Button, Middle Button, or Right Button.
- Select the type of click: Click, Double Click, Button Down, or Button Up.
- Select Relative To Screen or Window. Use the Window option when you work with varying screen resolutions (for example, a dual-monitor).

#### Move

Automates the movement of a mouse from one location to another.

Use Mouse Position (From) to specify the mouse starting position.

Either use the Capture button, specify numeric values, or press the F2 key to insert variables for the X and Y coordinates in Mouse Position.

Use Mouse Position (To) to specify mouse movement.

Either use the Capture button, specify numeric values, or press the F2 key to insert variables for the X and Y coordinates in Mouse Position.

The yellow prompt bar will change to red if the content you click is not a table.

Optionally, add a delay in milliseconds.

#### Scroll

Automates the action of mouse scrolling. Use this command in conjunction with Insert Mouse Click.

- Select a scrolling direction option, either Up or Down .
- Enter number of iterations.
- Specify the delay time required.

For applications that change titles:

If the name of the application window title changes over time, insert a wild card character (\*) at the start or end of the window title. This ensures that the application is consistently found when running the Logic.

For example, to ensure the Microsoft Excel application is always found, use 'Microsoft Excel\*' or '\*Excel' or '\*Excel\*'.

When Secure Recording Mode is enabled:

Images are not captured.

## Object Cloning command

Use this command to capture coordinates and images of objects from desktop and web-based applications.

When the task runs, this command searches and plays the object based on the object properties selected for search criteria.

The Object Cloning command enables you to:

- Capture objects in standard windows applications such as text boxes, combo boxes, buttons, and so on.
- Capture objects in web browsers (supported by plug-ins), for example, Microsoft Internet Explorer, Google Chrome, Microsoft Edge, and Mozilla Firefox.
- Capture objects with third-party interfaces through plug-ins for Flex (Flash), Java, and Silverlight.

Note: **11.3.3** Capturing objects based on Flex, Java, and Silverlight technologies from the Google Chrome and Mozilla Firefox browsers is not supported.

## Play mode

The Object Cloning command provides the following play modes to capture objects from an application or a browser:

#### Object

This play mode is the very precise and flexible that enables you to capture objects and search for those objects based on their properties. You can use this play mode to capture objects based on Microsoft Windows, HTML, JAVA, and FLEX technologies. You must ensure that the appropriate plug-ins are installed and configurations are set for HTML, FLEX, and JAVA. See [Using Plugin Settings](#) and [Java Settings](#).

#### Coordinates

This play mode enables you to capture coordinates of an object. It is useful in a window that has objects invisible to the capturing technology, for example, a Remote Desktop window or a Citrix application.

## Image

This play mode captures image of an object and enables a bot to search the object in an application or a browser based on the captured image.

This is useful for capturing the down button of a drop-down menu, but is limited when there are multiple instances of the same image in a window, for example text boxes.

## Automation in Microsoft Edge browser: known behavior

You cannot play an automation task that is recorded using Microsoft Internet Explorer in Microsoft Edge.

If you are unable to capture objects using the Object Cloning command, see [Troubleshooting Object Cloning](#).

### 11.3.2 Using the Object Cloning command with applications on Citrix environment

The remote agent for Citrix permits you to use the Object Cloning command to capture objects from the applications that are installed on a Citrix environment when the Enterprise client is installed outside the Citrix environment. Use the Object Cloning command to capture objects based on the Microsoft Windows, JAVA, and HTML technologies. See [Remote Agent for Citrix](#).

- [Using object play mode](#)

Use the object play mode to capture objects from an application or a browser. You can capture objects such as text box, radio button, text, titles, and much more.

- [Using coordinate play mode](#)

Use the coordinate play mode to capture the coordinates of an object. Use this mode if the position of the object does not change in an application.

- [Using image play mode](#)

Use the image play mode to capture the image of an object. Use this mode if the image is static in an application

- [Troubleshooting Object Cloning](#)

This topic explains what to do when you are unable to capture objects in Internet and/or Intranet websites using Object Cloning Command.

- [Remote agent for Citrix](#)

The remote agent for Citrix enables you to use the Object cloning command to automate tasks when the Enterprise client is installed outside the Citrix environment. If you plan to use Citrix XenApp, install the Citrix remote agent before you install the Enterprise client.

#### Related reference

[Using Plugin Settings](#)

[Java Settings](#)

[IF/ELSE command](#)

[Loop command](#)

## Using object play mode

Use the object play mode to capture objects from an application or a browser. You can capture objects such as text box, radio button, text, titles, and much more.

## Prerequisites

Ensure that the application or website from which you want to capture objects is open.

To capture an object using the object play mode, do the following:

## Procedure

1. Drag or double-click the Object Cloning command.  
The Object Cloning dialog box appears.
2. Select the application or website you want to use from the Select Window list.
3. Click Capture to capture an object.
4. Hover the pointer over the object you want to capture.  
A red highlight appears around the object and its properties are captured.
5. Select the Object play mode.
6. From the Select search criteria section in the OBJECT tab, select the object properties you want to use to search the object.  
A binocular icon appears next to the object property that is selected for searching the object.
7. You can click the Expand Search Criteria button to select more object properties for the search.  
The Search Criteria dialog box appears.
8. Select and assign values for the object properties that you want to include in the search criteria, from the Search Criteria dialog box.  
A binocular icon appears next to the properties you have selected for the search criteria.  
Note: You can use wildcard character (\*) when specifying values for all properties except Path and DOMXPath.
9. Select an option from the Select Action To Perform list to specify the action to be performed on the captured object:
  - Get Property
  - Get Total Items
  - Get Selected Index
  - Get Selected Text
  - Select Item By Text
  - Select Item By Index
  - Click
 

Note: Use the Click action to activate an on-click event in the browser when working with an HTML object.

    - Left Click
    - Right Click
    - Double Click
10. Select the Legacy Technology option when the target application uses legacy applications or is a secure environment.  
By default, this option is selected when you capture an object using legacy technologies.
11. **11.3.3** Select an option from the Select Technology list to specify the technology of the target application.  
Important: Depending on the type of technology used for creating the application, one or the other technology will be a better fit to detect the controls.
  - Default: Automatically tries to detect the technology to use for capturing an object.
  - Legacy: Uses legacy technology to detect and capture an object.
  - Standard: Uses the MSAA technology to detect and capture an object.

- Advanced: Uses the UIAutomation technology to detect and capture an object.
  - Advanced - WPF: Uses the specially designed WPF application and UIAutomation technology to detect and capture an object.
12. You can specify how much time the command should wait for an object to be available, in the Wait for the object to exist box.  
 This option enables you to specify the amount of time the command can should wait for an object.  
 The system will move on to the next command as soon as the object is available and does not wait for the entire time duration specified.
13. Click Save.

## Using coordinate play mode

Use the coordinate play mode to capture the coordinates of an object. Use this mode if the position of the object does not change in an application.

## Prerequisites

Ensure that the application or website from which you want to capture objects is open.

To capture an object using the coordinate play mode, do the following:

## Procedure

1. Drag or double-click the Object Cloning command.  
 The Object Cloning dialog box appears.
2. Select the application or website you want to use from the Select Window list.
3. Click Capture to capture an object.
4. Hover the pointer over the object you want to capture.  
 A red highlight appears around the object and its properties are captured.
5. Select the Coordinates play mode.  
 The position of the selected object is displayed as X and Y coordinates.
6. You can update the values in the X, Y, and Title fields.
7. You can click the Re-Capture Position option to recapture the coordinates of the object.
8. Select an option from the Select Action To Perform list to specify the action to be performed on the captured object:
  - Left Click
  - Middle Click
  - Right Click
  - Double Click
  - Get Text
  - Set Text
9. Select the Legacy Technology option when the target application uses legacy applications or is a secure environment.  
 By default, this option is selected when you capture an object using legacy technologies.
10. Click Save.

## Using image play mode

Use the image play mode to capture the image of an object. Use this mode if the image is static in an application

### Prerequisites

Ensure that the application or website from which you want to capture objects is open.

To capture an object using the image play mode, do the following:

### Procedure

1. Drag or double-click the Object Cloning command.  
The Object Cloning dialog box appears.
2. Select the application or website you want to use from the Select Window list.
3. Click Capture to capture an object.
4. Hover the pointer over the object you want to capture.  
A red highlight appears around the object and its properties are captured.
5. Select the Image play mode.  
A preview of the captured image is available in the Search Image section.  
Note: Preview of the captured image is not available if the secured recording mode is enabled.
6. You can click the Re-Capture Position option to recapture the coordinates of the object.
7. You can type a value in the Min. percentage to Image Match box to specify the minimum percentage match for the image.
8. Select an option from the Select Action To Perform list to specify the action to be performed on the captured object:
  - Left Click
  - Middle Click
  - Right Click
  - Double Click
  - Get Text
  - Set Text
9. Select the Legacy Technology option when the target application uses legacy applications or is a secure environment.  
By default, this option is selected when you capture an object using legacy technologies.
10. Click Save.

### Troubleshooting Object Cloning

This topic explains what to do when you are unable to capture objects in Internet and/or Intranet websites using Object Cloning Command.

If you are unable to capture objects in Internet and/or Intranet websites using Object Cloning Command, consider checking the security settings that are used for that site.

Go to Internet Explorer > Settings > Internet Options > Security.

## For Websites Not Assigned to Security Zone

If the website is not assigned to a security zone in Internet Explorer, the level of security set for the Internet zone is applied to it by default. To capture objects from such websites using Object Cloning Command, set the security level at Medium-high or lower.

## For Websites Assigned to Security Zone

- To capture objects in Local Intranet Websites: If your website is assigned only to a Local Intranet security zone in Internet Explorer, set the level of security in Local Intranet to Medium-high or lower and turn off the ActiveX Filter.
- To capture objects in Local Intranet Websites assigned to Trusted zone: If your Local Intranet website is assigned to Trusted sites security zone in Internet Explorer, set the level of security in Trusted sites to Medium-high or lower and turn off ActiveX Filter.
- To capture objects in Internet Websites: For websites in the Internet zone, set the level of security in Internet to Medium-high or lower.
- To capture objects in Internet Websites assigned to Trusted zone: If the Internet website is assigned to Trusted sites security zone in Internet Explorer, set the level of security in Trusted sites to Medium-high or lower.

## Remote agent for Citrix

The remote agent for Citrix enables you to use the Object cloning command to automate tasks when the Enterprise client is installed outside the Citrix environment. If you plan to use Citrix XenApp, install the Citrix remote agent before you install the Enterprise client.

**11.3.2** You can use the remote agent to use the Object cloning command to capture objects based on the Microsoft Windows, Java, and HTML technologies.

Note: **11.3.3** The Remote Agent for Citrix is now Citrix Ready certified. See [Citrix Ready Marketplace](#).

To use this approach, do the following:

### Before Enterprise client installation

Install the Automation Anywhere Citrix remote agent on the machine where Citrix XenApp is installed.  
Based on the version of the Enterprise client, install the corresponding version of the remote agent.  
Install the remote agent before you install Enterprise client.

### After Enterprise client installation

- Install the Citrix Receiver and Enterprise client Version 11.3.2 or greater on the machine you are using to automate the task.
- Install the Citrix plug-in on the system where the Enterprise client Version 11.3.2 is installed.
- Modify the `AA.Settings.xml` file.

- **Installing remote agent for Citrix**

Install the remote agent for Citrix only on the machine on which the Citrix XenApp virtual application is installed. Do this before you install Enterprise client.

- [Installing Citrix plug-in](#)

Install the Citrix plug-in only on the machine on which the Citrix Receiver and the Enterprise client Version 11.3.2 are installed.

Related tasks

[Installing remote agent for Citrix](#)

[Installing Citrix plug-in](#)

## Installing remote agent for Citrix

**11.3.2** Install the remote agent for Citrix only on the machine on which the Citrix XenApp virtual application is installed. Do this before you install Enterprise client.

Do the following steps to install the remote agent for Citrix:

### Procedure

1. Double-click the Automation\_Anywhere\_Remote\_Agent\_1.0.exe file.
2. On the Automation Anywhere Remote Agent Setup screen, click Yes.
3. On the Automation Anywhere Remote Agent screen, click Next.
4. On the License Agreement screen, select the option to accept the license agreement, and then click Next.
5. On the Choose Destination Location screen, click Browse to specify the location for installing the remote agent, and then click Next.  
The default location for installation is set to C:\Program Files (X86)\Automation Anywhere\AARemoteAgent
6. On the Setup Status screen, track the status of the installation process.
7. On the Setup Wizard Completed screen, click Finish to complete the setup.

Related concepts

[Remote agent for Citrix](#)

Related tasks

[Installing Citrix plug-in](#)

## Installing Citrix plug-in

**11.3.2** Install the Citrix plug-in only on the machine on which the Citrix Receiver and the Enterprise client Version 11.3.2 are installed.

Note: Install the Citrix receiver on the machine before you install the Citrix plug-in.

Do the following steps to install the Citrix plug-in:

### Procedure

1. Open the command prompt in Admin mode.

2. Change the directory to the location where the Enterprise client is installed.

For example, if the client is installed at the location C:\Program Files(x86)\Automation Anywhere\Enterprise\Client, you run the command cd "C:\Program Files(x86)\Automation Anywhere\Enterprise\Client".

3. Run the command AAPlugInInstallation.exe /citrix /install.

A success message appears after successful installation of the Citrix plug-in.

4. On the Automation Anywhere Client dialog box, click OK.

5. **11.3.2** Modify the AA.Settings.xml file:

- Select Options from the Tools menu on the Enterprise client window, to get the location of the file.
- Click Advanced Settings.
- Open the AA.Settings.xml file available at the location shown in the Application Path field.
- Add the tags highlighted in the following image in those tags:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
- <configuration>
  + <Editor>
  + <EventWatcher>
  - <Main>
    + <general>
    + <startuppages>
    - <options>
      + <activedirectory>
      - <advancedsettings>
        <ietimeoutvalue>240</ietimeoutvalue>
        <editondoubleclick>0</editondoubleclick>
        <recordmousemove>1</recordmousemove>
        <recordmouseclicks>1</recordmouseclicks>
        <recordkeystrokes>1</recordkeystrokes>
        <isremoteobjectdetectionenabled>true</isremoteobjectdetectionenabled>
        <capturescreenshotrecord>1</capturescreenshotrecord>
        <capturescreenshotplay>0</capturescreenshotplay>
        <enablelogging>1</enablelogging>
        <ietimeoutcheck>1</ietimeoutcheck>
        <applicationpath> </applicationpath>
      </advancedsettings>
      - <runtimesettings>
        <capturescreenshotplay>0</capturescreenshotplay>
        <citrixchanneltimeout>240000</citrixchanneltimeout>
      </runtimesettings>
    + <clientsettings>
```

The value in the citrixchanneltimeout tag specifies the timeout in milliseconds for a Citrix session.

Specify the required value.

6. Save and close the file.

Related concepts

[Remote agent for Citrix](#)

Related tasks

[Installing remote agent for Citrix](#)

## OCR Command

Use this command to extract text from images and transfer the extracted data to another application.

## Overview

The OCR command can be used to capture the window or specific area of an application. You can also use images that are stored on your local machine, network drive, or a website.

Automation Anywhere is an extensible platform and allows you to configure plug-ins for OCR engine of your choice. After you have successfully configured an OCR engine, it is available in Automation Anywhere and can be used to automate a task.

Automation Anywhere supports the following OCR engines to capture images:

- ABBYY
- TOCR
- MODI
- TESSARACT

Note: MODI and TOCR are third-party components and must be installed separately. Automation Anywhere automatically detects the MODI and TOCR engines after they are installed.

### 11.3.2 ABBYY

This is the default OCR engine that is bundled with the product and installed along with the Automation Anywhere Enterprise client. You need to manually configure ABBYY to be able to use it with Automation Anywhere solution. See, [Configuring ABBYY for Automation Anywhere](#) for more information.

## Tesseract

This OCR engine is bundled with the product and installed along with the Automation Anywhere Enterprise client. Microsoft Visual C++ 2015 redistributable must be installed on the machine to use Tesseract.

## MODI

Requires Microsoft Office 2003 or later installed on the machine. For Microsoft Office 2007, the Scanning, OCR, and Indexing Service Filter option in the Microsoft Office Document Imaging must be selected during installation. For Microsoft Office 2010, you need to install MODI separately. See, <https://support.microsoft.com/en-us/help/982760/install-modi-for-use-with-microsoft-office-2010> for more information.

When Secure Recording Mode is enabled:

No images are captured for preview.

- [Using the OCR Command](#)

Extracts text from the captured images.

- [Configuring ABBYY for Automation Anywhere](#)

Automation Anywhere supports a specific configuration of the ABBYY OCR engine to capture images.

## Using the OCR Command

Extracts text from the captured images.

Perform the following steps to use the OCR command in a task or MetaBot logic:

## Procedure

1. Expand the OCR node in the Commands tab.

The system displays the following operations:

- Capture Window: Capture an entire window as an image.
- Capture Area: Capture a specific area of an application window.
- Capture Image by Path: Specify the path of the image that contains the text you want to extract.
- Capture Image by URL: Specify the URL of the image.

2. Double-click or drag the operations.

The system displays the OCR dialog box.

3. Based on the sub-command you have selected, perform any of the following action:

- Capture Window: Select the application window you want to capture from the list.
- Capture Area:
  - a) Select the application window in which you want to specify the area to be captured.

The system displays the Capture Area option.

- b) Click Capture Area to capture area of the selected application window.

- Capture Image By Path: Specify the location of the image you want to use.
- Capture Image By URL: Specify the URL of the image you want to use.

Note: You can press the F2 key to select a variable that you want to use to specify an application window or location of an image.

4. Select an OCR engine you want to use from the OCR Engine list

5. Click Advanced Settings.

The system displays options to specify the threshold of the image.

6. Select the Enable image pre-processing option if you want the system to adjust gray-scale and contrasts in the captured images

Or, clear the Enable image pre-processing option and use the Threshold slider to set the threshold value.

Tip: You can also specify a threshold value in the field.

7. Click View Captured Text, to view the effect of threshold on the captured image.

Note: The system does not display captured images for preview in the Image Preview section if you have captured images in the Secure Recording mode.

See, [Secure recording mode](#) for more information.

8. Select the Filter the capture text option, to filter the captured text.

The system displays the Before and After fields.

- a) Specify the text you want to filter out before and after the required text in the Before and After fields respectively.

For example, if you want to extract 'ABC Inc.' from the captured text 'Name: ABC Inc. Location:', you must specify Location in the Before field and Name in the After field.

9. Select the Trim the captured text option to trim the extra spaces in the captured text.

10. Select a variable from the Assign the value to an existing variable list, to assign the captured text to the variable, and then click Save.

### Related tasks

[Configuring ABBYY for Automation Anywhere](#)

### Related reference

## OCR Command

### Configuring ABBYY for Automation Anywhere

Automation Anywhere supports a specific configuration of the ABBYY OCR engine to capture images.

Do the following steps to configure ABBYY for Automation Anywhere:

### Procedure

1. Install ABBYY FineReader engine 11 on the machine.

Note: **11.3.2** If you are using the Enterprise client Version 11.3.2, the FineReader 12 is installed by default in the Enterprise client Version 11.3.2 and does not require separate installation.

2. Use your license key to activate ABBYY through the ABBYY License Manager.
3. Modify the app.config file available at the `C:\Program Files (x86)\Automation Anywhere\Enterprise\Client\plugins\commands\ocr\ABBYY`.
  - a) Specify your ABBYY license key in the following tag:  
`add key="LicenseKey" value="YOUR ABBYY LICENSE KEY"/`
  - b) Specify the location where you installed ABBYY FineReader in the following tag:  
`add key ="EnginePath" value="LOCATION WHERE FINEREADER IS INSTALLED"/`
  - c) Specify the location of the ABBYY parameters file in the following tag:  
`add key ="ProfilePath" value="LOCATION OF THE ABBYY_Parameters.ini FILE"/`
  - d) **11.3.2** Specify the following parameter if using ABBY version 11 with Enterprise client Version 11.3.2:  
`add key ="FREVersion11" value="true"`

**11.3.2** If you are using FineReader 12:

- Specify the location of the ABBYY parameters file in the following tag:

`add key ="ProfilePath" value="LOCATION OF THE ABBYY_Parameters.ini FILE"/`

- Ensure that you have the Modify and Write permissions for the `C:\Program Files (x86)\Automation Anywhere\Enterprise\Client\plugins\commands\ocr\ABBYY` folder.

The ABBYY OCR engine uses a set of predefined parameters with their corresponding default values. To optimize the value of the extracted text, change the values of these parameters available in the `ABBYY_Parameters.ini` file. You can uncomment the available parameters in the file or add new parameters and their values that are supported by ABBYY. Any changes you make in this file are reflected in all the instances where OCR is used in Automation Anywhere.

### Open Program/File command

Use the Open Program/File command to automatically launch a program or open a file.

The Open Program/File command enables users to do the following actions:

- If the program requires command line parameters, you can provide these parameters in the Parameters text box.

- If required, provide the directory path for your program in the 'Start in' Path text box. Automation Anywhere will verify that this path is valid.
- You can insert the current window title in a TaskBot / MetaBot Logic.
- You can enter variables in a file path.

Related reference

[File and Folder command](#)

[Log-to-File command](#)

[Manage Window Controls command](#)

[System command](#)

[Windows Actions command](#)

## Pause command

Use the Pause command to pause an automated task at a particular point when it runs.

Inserting pauses into your tasks enables you to enter or modify information before a task completes a run.

Insert a pause in your task when you need to check the status of attributes while the task is running. This is a great way to test and debug your tasks.

When a task reaches a pause, a Resume button appears. When you click on the Resume button, the task continues to run again.

Pause Task is a sub-command under the Task command. Expand Task to view its sub-commands.

Related reference

[Delay/Wait command](#)

[Run Task command](#)

[Stop Task command](#)

## PDF integration command

Use the PDF integration command for PDF manipulation tasks including extract, merge, split, encrypt, and decrypt.

**PDF to Image**

Converts a PDF document into a specified image file type.

**Extract Form Fields**

Extracts all form field data and selected text, and stores the data in variables.

**Extract Text**

Extracts text from a PDF file to a text file.

**Merge Documents**

Merges selected PDF documents into a single PDF file. Supports both encrypted and unencrypted PDFs.

**Split Document**

Splits the PDF by a specified output.

**Encrypt Document**

Encrypts the PDF and gives permissions to users.

**Decrypt Document**

Decrypts the previously encrypted PDF.

Tip: In the above mentioned commands, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- [Converting a PDF to an image command](#)

Use the PDF command to convert a PDF document into a separate image files.

- [Extracting Form Fields command](#)

Use the command to extract form fields and selected text to variables.

- [Extracting Text command](#)

Use the command to extract text from a PDF file to a .txt file.

- [Merging documents command](#)

Use the command to combine two or more PDF files into a single file.

- [Splitting documents](#)

Use this command to split a PDF file into separate files based on user specifications.

- [Encrypting a document command](#)

Use the command to encrypt PDF files and give permissions to users.

- [Decrypting a document command](#)

Use the command to decrypt a previously encrypted file.

Related reference

[PDF System Variables](#)

## Converting a PDF to an image command

Use the PDF command to convert a PDF document into a separate image files.

Use the following steps:

## Procedure

1. Click Browse to select the PDF file.

- If the file is encrypted, provide the user or owner password.
- Press the F2 key to insert a Credential Variable.

2. Specify the page range.

3. From the drop-down list, select an output type..

The following types are available: BMP, EMF, EXIF, GIF, JPEG, PNG, TIFF (default), and WMF.

For JPEG output, specify a dpi quality from 0 through 100.

4. Click Browse to select the folder for saving the images.

5. Specify an image name as a prefix for the image files.

The files' suffixes are index numbers.

6. Optional: Mark the check box to overwrite existing output files with the same file name.

7. In the Advanced View section:

a) Modify the X Resolution and Y Resolution. The default is 200 dpi.

b) Select an Image output type (either Color or Grayscale).

c) Select a Color property. The default is True Color (32 bits).

d) For TIFF files, select a TIFF compression type.

Related tasks

[Create credential](#)

## Extracting Form Fields command

Use the command to extract form fields and selected text to variables.

Do the following steps:

### Procedure

1. Click Browse to select the PDF file.  
If the file is encrypted, provide the user or owner passwords.
2. Click Add to insert new fields, Edit to update existing ones, or Delete to remove unneeded fields.  
The PDF Viewer window opens with the form fields outlined in dotted red.
3. To insert a field, right-click inside the red box and select Add Field.
4. Assign the field to a variable from the drop-down menu.
5. Click OK.
6. Click Save.

## Extracting Text command

Use the command to extract text from a PDF file to a .txt file.

Do the following steps:

### Procedure

1. Click Browse to select the PDF file.  
If the file is encrypted, provide the user or owner passwords.
2. Select a text type.
  - Plain Text: Similar to a simple copy/paste of the entire PDF file.
  - Structured Text: Preserves the formatting from the original PDF file.
3. Select a page range.
4. Specify the name of the output file.
5. Optional: Mark the check box to overwrite existing output files with the same file name.
6. Click Save.

Related reference

[PDF integration command](#)

## Merging documents command

Use the command to combine two or more PDF files into a single file.

Do the following steps:

### Procedure

1. Click Add.  
If the file is encrypted, provide the user or owner password.
2. Specify which pages to include for each PDF file.

- Click Delete to remove unwanted files.
3. Click Browse to specify an output file path for the merged PDF file.
  4. Optional: Mark the check box to overwrite existing output files with the same file name
  5. Click Save.

Related reference

[PDF integration command](#)

## Splitting documents

Use this command to split a PDF file into separate files based on user specifications.

Follow these steps:

### Procedure

1. Select the PDF file to split and type the user or owner passwords if the file is encrypted.
2. Specify the Output File Creation options:
  - Pages per file: Specify the number of pages each new output file will contain (for example, 5 pages for each split).
  - Single file with page range: Select this option to create a single output file that contains the specified page numbers.
  - Blank page as a separator: Select this option to generate a new output file whenever a blank page appears in the PDF document.
  - Bookmark level per file: Splits the file by the PDF bookmark level. If three levels are present, the drop-down list shows Level1, Level2, and Level3 as options. Split the PDF by selecting the appropriate bookmark level.
3. Folder path: Specify the folder location for saving all output files.
4. Specify the filename as a prefix for the PDF files.  
The files contain index numbers as suffixes.
5. Optional: Mark the check box to overwrite existing output files with the same filename.
6. Click Save.

Related reference

[PDF integration command](#)

## Encrypting a document command

Use the command to encrypt PDF files and give permissions to users.

Do the following steps:

### Procedure

1. Click Browse to select the PDF file to encrypt.
2. Optional: Set the user and owner passwords for the encrypted file.
3. Select one or more user permissions to apply to the encrypted document for the user.
4. Select an encryption level (RC4 40-bit, RC4 128-bit, or AES 128-bit).
5. Specify the name of the output file.
6. Optional: Mark the check box to overwrite the existing output files with the same file name.
7. Click Save.

---

Related tasks

[Decrypting a document command](#)

Related reference

[PDF integration command](#)

## Decrypting a document command

Use the command to decrypt a previously encrypted file.

Do the following steps:

### Procedure

1. Click Browse to select an encrypted PDF file to decrypt.
2. Type the user/owner password.
3. Specify an output file name with a .pdf extension to save the decrypted PDF.  
The password security is removed for the decrypted file. The file keeps the same permissions as the original file.
4. Optional: Mark the check box to overwrite existing output files with the same file name.
5. Click Save.

Related tasks

[Encrypting a document command](#)

Related reference

[PDF integration command](#)

## PGP command

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

### Overview

The PGP command automates the process of encrypting and decrypting files.

The command supports two types of encryption: symmetric (passphrase) and asymmetric (public/private keys):

- PGP Passphrase: Requires a pass phrase to encrypt and decrypt.
- PGP Public/Private Key: Requires a PGP public and private key file to encrypt and decrypt.

### Encrypt Files

Encrypts one or more files using one of the above encryption methods.

Select a symmetric algorithm from the drop-down menu. The algorithm options are:

- Idea
- TripleDES
- CAST5
- Blowfish
- AES128
- AES192

- AES256
- Twofish256

Optionally, mark the Overwrite Files/Folder check box to replace older files with the same name.

If required, append the extension for the destination file. For example, .enc.

Compress the encrypted files using one of the compression algorithms:

- zip
- bzip2
- zlib

If required, mark the Armor data (text output) check box to enable ASCII Armor output.

#### Decrypt Files

Decrypts one or more files that have been previously encrypted.

Optionally, mark the Overwrite Files/Folder check box to replace older files with the same name.

If required, append the extension for the destination file. For example, .enc.

#### Create Keys

Creates public and private encryption keys.

Add additional security to the keys by specifying a password that encrypts the keys.

Optionally, mark the Overwrite Files check box to replace older files with the same name.

Tip: In the above mentioned commands, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

## Play Sound command

Use the Play Sound command to insert and play sounds before or after running an action.

#### Play Beep

Plays a beep sound. Users can use this sound to alert users when particular actions take place, or when prompted for input.

#### Play Media File

Plays a media file. When the task plays the media file, it does not proceed to the next automation task command until the media file finishes playing.

## Printer Settings command

Use the Printer Settings command to automate printer settings.

## Overview

One of the most manually intensive activities of any IT staff involve managing printer settings for individuals and groups. Using the Printer Settings command, users can automate many of these tasks.

#### Get Default Printer

Retrieves the default printer and optionally assigns the value to a variable.

#### Set Default Printer

Changes the default printer.

## Remove Printer

Removes the selected printer.

### Related reference

[Active Directory command](#)

[System command](#)

[SNMP command](#)

## Prompt command

Use the Prompt command to insert a user prompt that requests input from a user when running an automated task.

### Prompt for Value

Use this command in tasks where the values change frequently, for example tasks that interact with online forms. The entered value can be assigned to a variable.

Enable the Encrypt Keystrokes check box to prompt users for passwords and encrypt the keystrokes.

An encrypted value cannot be assigned to a variable.

### Prompt for File

Prompts user for one or more files from a single folder. The value of the files selected can be assigned to a list variable. Users can configure a caption for the prompt window.

### Prompt for Folder

Prompts the user for a single folder. The value of the folder selected can be assigned to a value variable. Users can configure a caption for the prompt window.

### Prompt for Yes/No

Prompts the user for a Yes or No response to a question while the task is running. The value selected during playback can be assigned to a value variable.

### Related reference

[Message Box command](#)

[Variable Operation command](#)

[Knowing When to Use Variables](#)

## Read from CSV/Text command

Use the Read from CSV/Text command to automate the process of reading data from CSV and Text files and encode the files using ANSI, Unicode, or UTF8.

### CSV

Reads data using a Comma, Tab, or Regional List Separator delimiters from a CSV file.

Select from the following delimiter options:

- Comma: Use this to specify a comma as the delimiter.
- Regional List Separator: Use this to specify the delimiter as defined in the Regional Settings. Automation Anywhere supports the default regional list separators of English, French, German, Italian, and Spanish.

You can update the separator value from the Control Panel > Region > Additional Settings.

For example, if the regional settings are configured to German, a semicolon (;) is used as a list separator.

- Tab: If tabs are used to separate fields in a CSV file, use this to specify the delimiter.

Contains Header: Use this for CSV files that have the first row defined as headers.

#### Text

Reads data using Newline, Comma, Tab or Other delimiters from a Text file.

- Newline: If the text in the file is separated using a newline, use this.
- Comma: If the text in the file is separated using a comma, use this.
- Tab: If the text in the file is separated using a tab, use this.
- Other: If the text in the file is separated using any option other than the ones provided, use this.

#### Other Options

- Trim: Use this to trim leading space(s) and/or trailing space(s) from inside the CSV/Text file.
- Session Name: Use this to identify the current session. You can opt to assign a variable as a session.

## REST Web Service command

Use the REST Web Service command to test REST webservices using the HTTP methods GET, POST, PUT, and DELETE.

### Overview

### Methods

#### GET Method

Retrieves information (in the form of an entity) as identified by the Request URI.

#### POST Method

Requests that the server accepts the entity enclosed in the request as a new subordinate of the web resource identified.

#### PUT Method

Updates a record by passing different URI parameters based on the Key-Value pair.

#### DELETE Method

Requests that the origin server deletes the identified resource.

### Variable Support for REST Web Service using F2 Key

- URL Parameterization: Users can add variables in the Request tab.
  - Parameter: Users can add variables for Parameter tab values which include URL Values, Post values and Authorization Values.
1. Click Send Request, which will display the Set Variable From with values of the variables.

Note: In Request Header or POST Parameter, if a Credential Variable is used then on clicking Send Request the Set Variable Value will not list the Credential Variable. However its value will be used to generate the output.

You are shown a message notifying that Credential Variable(s) are excluded from the list of variables. Read more about [Assigning credential variables from credential lockers](#).

## 2. Click Get Output to get the Response.

Note: If your REST Web Service is using a proxy server, go to Tools > Options > Advanced Settings. Troubleshoot Send Request error

Customers who upgrade to the current version of Enterprise client from v.11.3 and less might have to update the default REST Client type configured in the AASettings.xml file if the Send Request errors out.

To troubleshoot, the REST Client type can be configured to use

`nativorestclient`

instead of default

`RestSharp`

in Player commands node as shown:

```
<Player>
  <commands>
    <restwebservice>
      <restclienttype>nativorestclient</restclienttype>
    </restwebservice>
  </commands>
</Player>
```

- [Using the REST Web Service Command](#)

Create a new web service to automate data access and exchange.

Related reference

[SOAP Web Service command](#)

## Using the REST Web Service Command

Create a new web service to automate data access and exchange.

To create a new web service, do the following:

## Procedure

### 1. Specify the URI for the REST Web Service.

Press the F2 to insert a Credential, Local, or System variable.

Users can insert a single the Local or System variable for the entire URI or multiple the Local or System variables in a single URI. For example, `$vDomain$/$vAPI$/${vParam$}`

Note: Only a single the Credential Variable can be inserted for the entire URI.

2. Select the Method from the drop-down menu.

Select from GET, POST, PUT, DELETE.

3. Specify the Request values.

URI Header: Key-Value pairs are explained below.

- HTTPS: True, when the HTTPS connection is used.
- Server URL: Indicates the main host or the server where the web service is being tested.
- Port No: Displays the port number used for connection to the web service.
- URL Path: Displays relative URL of the specific web service.

Header: Key-Value pairs are displayed as applicable for the selected Method. Users can customize these header key-value pair using action buttons:

- Add a Key-Value pair to a web service request, if the request has additional fields or parameters.
- Delete a Key-Value pair by selecting the row and clicking Delete.

4. Click the Send Request. This will automatically fill in the Response and can be saved to a variable for ease of processing.

If variables are used in the URI field:

- When the user clicks Send Request, a message with a list of variables is inserted in the URI field along with their default values.
- Users can modify the default value or assign a value if no default value has been set. Click Get output to send the request.

Note: Press F2 to insert a Credential Variable to enhance security.

5. Specify the Parameter values.

- URL: Displays the URL Parameters for the current web service request with Key-Value pairs.
  - Add a URL or Post Parameter to a recorded request, if the request has additional fields or parameters.
  - Delete a URL or Post Parameter by selecting the row and clicking Delete.
- POST Parameter: Displays the Post Parameters for the current request. Applicable when Method is POST or PUT.
- Authorization: REST Web Service supports HTTP Basic, Windows AD, and Default Network Credentials authentication types. Based on authentication type, add the authorization parameters such as the Domain, Username, and Password.
  - To use "logged-in" Active Directory (AD) user's credentials for authentication - leave all the fields blank. Logged-in user's AD domain will be considered for authentication purpose.
  - To use a particular Active Directory user's credentials for authentication - enter Domain, Username and Password.
  - To use HTTP basic authentication - leave the Domain field blank and enter Username and Password.

Users can assign direct values, user-defined variables or credential variables for authentication fields.

Tip: When inputting authorization parameters, ensure that the service supports that authentication type.

Click Send Request and the Response will be filled in automatically. The response should be stored in a variable for further processing.

6. The Response for web service supports both XML and JSON formats.

- Header: Displays the detail keys and values of response header for the request.
- Body: Displays the response body for the selected request. This response body should be saved to an appropriate variable for testing of the GET Method.
- Save Response To: This option enables you to save the entire Response Body. Select the variable from the drop-down and save the command. The selected variable stores the Response Body during the run time.

- **11.3.2.3** **11.3.3** Save Header To (Optional): This option enables you to save the entire Response Header. Select the variable from the drop-down and save the command. The selected variable stores the Response Header during the run time.

Related reference

[REST Web Service command](#)

Related information

[Credential variables](#)

## Run Script command

Use the Run Script command to run scripts from the TaskBot / MetaBot Logic.

### Overview

Use a Run Script command to do the following:

- Run Visual Basic Script (\*.vbs) or JavaScript (\*.js) in the TaskBot / MetaBot Logic.
- Pass parameters to your scripts.
- Specify the Return Value in your scripts.

Related reference

[Run Task command](#)

[Variable Operation command](#)

## Run Task command

Use the Run Task command to enable nesting of several tasks into a master task.

Using the Run Task command, users can run several small tasks from within a larger task. This is done by imbedding several tasks into a single master task, then scheduling the master task. This is called nesting tasks.

Run Task is a sub-command under the Task command. Expand Task to view its sub-commands.

- [Using the Run Task Command](#)  
Nests several child TaskBots into a master TaskBot.

Related reference

[Passing a Variable between Running Tasks](#)

### Using the Run Task Command

Nests several child TaskBots into a master TaskBot.

To insert a Run Task command, follow these steps:

### Procedure

1. Double-click or drag the Run Task command to the Task Actions List pane.

The Run Task window will open.

2. Select the task either using Browse or type the path using a Variable  
If using a variable for the file path, use only the system variable \$AAApplicationPath\$. If using a locally-defined or any other system variable, the sub task with such variables will not be uploaded to the Enterprise Control Room. Users will get 'Variabialized Path' in the Remarks column of the Upload Dependencies dialog box.
3. Select one of the options: Repeat, Speed, or Variable.
  - Repeat: Runs the selected task multiple times for a specified number of times or for a number of hours. The task can be repeated until the user chooses to stop it.
  - Speed: Sets the replay speed of the task. Three speeds are available: Standard (same speed as recorded), High Speed, and Turbo Action (mouse moves are removed).
  - Variable: Passes a variable from the master task (Main Task Variable) to the sub task (Run Task Variable).
    - Variables can only be associated if they belong to the same category (Value variable types with other Value variable types and Array variable of Value types with another Array variable of Value types).
    - In Array variables, only Array variable with Value type is supported while Array variables such as Read from text, excel or csv are not supported.
    - Inserting variable(s) in Run Task Variable: To specify the mapping variables for Run Task, either select a variable from the existing variables list or insert a new variable.
    - Quick Mapping of Variables: A 'Quick Map' ensures that a large number of variables with same nomenclature are associated between tasks. On selection of another task (using browse), the current mapping will be lost.
      - **11.3.2** If you click Quick Map without specifying a task, then the message "Please specify valid task path." is displayed.
      - **11.3.2** If the child task does not contain any matching variable as compared to the parent task then the message "0 Variables have been mapped." is displayed.

Mapping of 'Workflow Variables' is also possible in similar fashion.

Note: It is possible to pass value type variables marked as Regular Expression.

4. Click Save.

Related reference

[Uploading and downloading bots, workflows, and dependencies](#)

## SAP Integration Command

Automation Anywhere allows you to automate tasks and processes on your SAP system using the SAP Integration command.

You can use this solution to automate tasks in a SAP environment through front end, back end, and business rules to achieve optimum results.

This solution also helps you to:

- 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

## License Requirements

**11.3.2.3 11.3.3** You do not need a separate license to automate tasks in an SAP system. However, you must have SAP connector for Microsoft .Net (NCo 3.0.21.0) to connect to an SAP system.

## SAP Integration Methods

You can use any of the following methods to automate a task or process in the SAP system:

### MetaBot

MetaBot leverages SAP's VB scripting in the GUI and can be used to automate various tasks such as reading from fields, entering data in fields, and exporting tables to a CSV file. MetaBot also provides the ability to automate offline, which allows you to capture screens from the SAP and automate a task. This feature is useful when the access to an SAP system is for a limited period.

### BAPI

Automation Anywhere provides various SAP integration commands to integrate with SAP's standard APIs. You can use this integration method when GUI scripting is not enabled in an SAP system or you do not want to automate using the GUI.

Note: You must install SAP plugin to use BAPI for automating tasks on an SAP system.

### Keystrokes

You can also use keystrokes to automate a task on an SAP system. This method uses the structured and consistent layout of SAP GUI to create automation solutions. You use this method when the GUI scripting is not enabled, and SAP plugin is not installed.

- [Using MetaBot to automate a task in SAP](#)

You can use MetaBot to automate the various tasks in an SAP system such as creating a sales order, updating vendor information, generating invoices, and so on.

- [Using BAPI to automate tasks in SAP](#)

Automation Anywhere Enterprise integrates with SAP using Business Application Programming Interface (BAPI). BAPI is a standardized method that allows a third-party application to interact with an SAP system.

- [Using the connect command](#)

You use the Connect command to establish a connection to an SAP system. Based on the connection type used by your organization, you can use the Custom Application Server or the Group/Server Selection type to establish a connection.

- [Using custom workflow](#)

Automation Anywhere Enterprise provides predefined workflows that allow you to create a sales order and update a sales agreement.

- [Using SAP remote function call](#)

Automation Anywhere Enterprise provides remote function calls that allow you to store values of BAPI into different variables.

- [Using GUI Automation](#)

Automation Anywhere Enterprise enables you to capture objects from the SAP GUI using the GUI Automation command.

## Using MetaBot to automate a task in SAP

You can use MetaBot to automate the various tasks in an SAP system such as creating a sales order, updating vendor information, generating invoices, and so on.

Below are the prerequisites for using MetaBot to automate a task in SAP:

- GUI scripting must be enabled in SAP
- The user automating the task must have MetaBot Designer role

See, [MetaBot Designer Overview](#)

## Using BAPI to automate tasks in SAP

Automation Anywhere Enterprise integrates with SAP using Business Application Programming Interface (BAPI). BAPI is a standardized method that allows a third-party application to interact with an SAP system.

Automation Anywhere Enterprise provides four commands to integrate with an SAP system:

- Connect
- Run Standard BAPI
- Run Custom Workflow
- Run Remote Function Call

## Prerequisites

SAP plug-in bundle must be installed on the machine used to automate tasks on an SAP system.

If you are using Enterprise client version 11.x, you must:

1. Download the SAP .NET Connector from the SAP website.
  2. Install the SAP .NET Connector on your machine.
  3. Copy the `sapnco.dll` and `sapnco_utils.dll` files from the SAP .NET Connector installation folder to the Enterprise client installation folder.
- [Using standard BAPI](#)  
Automation Anywhere Enterprise allows you to use SAP standardized BAPIs that provide basic functions and can be used for various SAP business objects.

## Using standard BAPI

Automation Anywhere Enterprise allows you to use SAP standardized BAPIs that provide basic functions and can be used for various SAP business objects.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Using BAPI to automate tasks in SAP](#) are met.

Note: You must use Connect as the first command when you automate an SAP task using BAPI.

To use SAP standardized BAPIs:

## Procedure

1. Expand the SAP Integration command node and double-click the Run Standard BAPI command.  
The SAP Integration dialog box appears.
2. Enter a name for the session in the Session Name field.
3. Click the Select option next to the Select Standard BAPI field.  
The BAPI Explorer dialog box appears. The dialog box lists all the BAPIs that are available for the various SAP modules.
4. Select the BAPI you want to use from the Select BAPI section.
5. You can click the Import, Export, and Table tabs, to view the import, export, and table parameters for the BAPI you have selected.
6. Click OK.  
The selected BAPI is now available in the SAP Integration dialog box.
7. You can select the Save Output to CSV option, to save the output into a CSV file.
8. Enter a location where you want to save the file.
9. Select an option from the Encoding list, to specify the encoding stand you want to apply on the CSV file.
10. You can select the Append to csv option if you want to append the output to an existing CSV file, and then click Save.

## Using the connect command

You use the Connect command to establish a connection to an SAP system. Based on the connection type used by your organization, you can use the Custom Application Server or the Group/Server Selection type to establish a connection.

## Prerequisites

Ensure that all the prerequisites mentioned in the [Using BAPI to automate tasks in SAP](#) are met.

To connect to an SAP system:

## Procedure

1. Expand the SAP Integration command node and double-click the Connect command.  
The SAP Integration dialog box appears.
2. Enter a name for the session in the Session Name field.
3. Select an option from the Connection Type list, to specify the connection type to be used.  
Following options are available:
  - Custom Application Server
  - Group/Server Selection
4. Enter details in the following fields:
  - Application Server Host
  - Client
  - User Name
  - Password
  - System Number

- Language
- System ID
- SAP Router String
- Gateway Host
- Logon Group

Note: The Gateway Host and Logon Group options are available for the Group/Server Selection connection type.

5. You can click Test Connection, to test the connection, and then click Save.  
The command to connect to the specified SAP system is added to the Workbench.

#### Related reference

[Using BAPI to automate tasks in SAP](#)

## Using custom workflow

Automation Anywhere Enterprise provides predefined workflows that allow you to create a sales order and update a sales agreement.

## Prerequisites

To use a custom workflow:

## Procedure

1. Expand the SAP Integration command node and double-click the Run Custom Workflow command.  
The SAP Integration dialog box appears.
2. Enter a name for the session in the Session Name field.
3. Select the workflow you want to run from the Select Custom Workflow list.  
The system displays the import, export, and table parameters for the selected workflow in the Import, Export, and Table tabs.
4. Click View for a parameter to set values for that parameter.  
The Parameter Details dialog box appears.
5. Select an option to specify the source.  
Following options are available:
  - Set Fixed Values: This option allows you to set fixed values for the parameter.
  - Set From Array Variable: This option allows you to use set values from an array variable.
6. If you have selected the Set Fixed Values option in the above step, you can provide values for the available fields in the Value column.  
Or,  
If you have selected the Set From Array Variable option, you can select an array variable from the list.

You can also press F2 and select the array variable you want to use.

7. Click Save.
8. You can select the Save Output to CSV option, to save the output into a CSV file.
9. Enter a location where you want to save the file.
10. Select an option from the Encoding list, to specify the encoding you want to apply when writing the output to the CSV file.
11. You can select the Append to csv option if you want to append the output to an existing CSV file, and then click Save.

## Using SAP remote function call

Automation Anywhere Enterprise provides remote function calls that allow you to store values of BAPI into different variables.

## Prerequisites

Following remote function calls are available:

- Create Function
- Invoke Function
- Get Data
- Set Data

Note: We recommend that users using the remote function calls have knowledge of BAPI as the variables used to assign values are used in complex processes.

To use a remote function call:

## Procedure

1. Expand the SAP Integration command node and double-click the Run Remote Function Calls command.  
The SAP Integration dialog box appears.
2. Enter a name for the session in the Session Name field.
3. If you select the Create Function option:
  - a) Enter name of the function you want to use in the Function Alias Name field.
  - b) Enter name of the BAPI you want to use in the BAPI Name field.
  - Or,
  - c) You can select the Begin Sequence option, to mark the starting point of a process.
4. If you select the Invoke Function option:
  - a) Enter name of the function you want to invoke in the Function Alias Name field. You can use multiple instances of Invoke Function option to invoke various functions of a process. These instances must be used in the sequence corresponding to the task you want to automate.
  - b) You can select the End Sequence option, to mark the end of the process.
  - c) You can select the Commit Transaction, to commit changes made during the process.
5. If you select the Get Data option:

Table 1.

Option	Sub-options
Field	Table Function Structure
Table	Memory Variable

Option	Sub-options
	CSV
Structure	Memory Variable CSV

Based on the options you have selected for Get and From section, the relevant options are displayed.

6. If you have selected the Set Data option:

The following options are available:

- Field
  - Table
  - Function
  - Structure
- Table: Specify the table alias name in the field.
- Structure: Specify the structure alias name in the field.

7. Click Save.

## Using GUI Automation

**11.3.3** Automation Anywhere Enterprise enables you to capture objects from the SAP GUI using the GUI Automation command.

### Prerequisites

- Open the Enterprise client and SAP GUI application in the same mode. For example, if you open the Enterprise client in the Administrator mode, you must also open the SAP GUI application in the 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. See [Enabling Scripting on the Client Side](#) and [Enabling Scripting on the Server Side](#).
- Ensure that SAP GUI version 740 or later is installed.

To capture objects from the SAP GUI application, do the following:

### Procedure

1. Expand the SAP Integration command node and double-click the GUI Automation command.  
The SAP Integration dialog box appears.
2. From the SAP Window Title list, select the SAP window to specify the window from which you want to capture an object.  
The list populates all the windows that are currently open in the SAP GUI application. If a window that is open in the SAP GUI application is not available in the list, click Refresh to update the list.
3. Click Capture to capture an object.  
The SAP application window you have selected appears.
4. Press and hold the left mouse button and drag the mouse over the object you want to capture.

A red highlight appears around the object. Its properties are captured when the mouse is released over it.

- In the Object Details section, select the properties of the object that you want to use to search for the object.

Note: The Id and SessionId properties are selected by default.

- From the Select Action To Perform list, select an option to specify the action that you want to perform on the object.

The options available in the list vary based on the type of object you have captured.

Note: The Assign To Variable list is available when you select certain actions from the Select Action To Perform list. This list is available for those actions that return a value after they are executed and enables you to assign that value to a variable. The value returned by an action can be a property of an object or the value of the selected text.

- Based on the option selected from the Select Action To Perform list, enter a value in the Value field of the Action Parameters section. See [Actions available for captured objects](#).

- In the Wait for the object to exist field, specify how much time the command should wait for an object to be available.

This option enables you to specify the amount of time the command should wait for an object. The system moves on to the next command as soon as the object is available and does not wait for the entire duration specified.

- Click Save.

- [Actions available for captured objects](#)

The GUI Automation command enables you to perform various actions on the objects you have captured from the SAP GUI.

## Actions available for captured objects

**11.3.3** The GUI Automation command enables you to perform various actions on the objects you have captured from the SAP GUI.

The actions that you can perform on an object depend on the type of the object. The following table lists the actions available for each object type:

Object Type	Actions Available
Text box	Set Text Append Text Get Property Set Focus Left Click Right Click Double Click

	Select Item By Index Select Item By Text Select Item By Key Get Total Items Get Selected Item Text Get Selected Item Key Get Selected Item Index Get Property Set Focus Left Click Right Click Double Click <p>Note: The index for the combo box starts with zero. For example, if you want to select the second item in the combo box, you must specify one as the value.</p>
Check box	Check Uncheck Toggle Get Status Get Property Set Focus Left Click Right Click Double Click
Button	Click Get Property

	Set Focus Left Click Right Click Double Click
Radio button	Select Get Status Get Property Set Focus Left Click Right Click Double Click
Table	Set Cell By Index Get Cell Text By Index Get Total Rows Get Total Columns Select Row Export To CSV Get Property Set Focus Left Click Right Click Double Click <p>Note: The index for row and column starts with zero. To select or clear a check box in a table, you must specify <b>check</b> or <b>uncheck</b> as the value in the Value field. Similarly, you must specify <b>select</b> or <b>deselect</b> to select or clear a radio button.</p>

Menu bar	<p>Select Item By Text</p> <p>Get Property</p> <p>Set Focus</p> <p>Left Click</p> <p>Right Click</p> <p>Double Click</p>
Tree	<p>Expand Node</p> <p>Select Node By Text</p> <p>Get Property</p> <p>Set Focus</p> <p>Left Click</p> <p>Right Click</p> <p>Double Click</p> <p>Note: Provide name of the node and its occurrence. The value for occurrence starts with one.</p>
Tab	<p>Select</p> <p>ScrollToLeft</p> <p>Get Property</p> <p>Set Focus</p> <p>Left Click</p> <p>Right Click</p> <p>Double Click</p>
Shell	<p>Get Property</p> <p>Set Focus</p> <p>Left Click</p>

	Right Click  Double Click
Grid view	Select All  Set Cell By Index  Set Current Row  Click Cell By Index  Double Click Current Cell  Get Total Rows  Get Total Columns  Get Cell By Index  Export To CSV  Get Property  Set Focus  Left Click  Right Click  Double Click  Note: The index for row and column starts with zero.
Main window	Send Key  Close Window  Maximize Window  Activate Window  Restore Window  Get Focus Control Id  Get Property  Set Focus  Left Click

	Right Click Double Click
Shell:ToolbarControl	Press Button Select Context Menu Item By Text Get Property Set Focus Left Click Right Click Double Click  Note: The position of a button on toolbar starts with zero.
Rest of the Control	Set Focus Get Property Left Click Right Click Double Click

## Screen Capture command

Use the Screen Capture command to automate the process of capturing screen shots.

### Overview

With the Screen Capture command, users can capture the entire computer screen or an active open window, and save it in a specified location and image format.

#### Capture Desktop

Captures an image of the full desktop.

#### Capture Window

Captures an image of an open application window. Select the window from the drop-down list.

#### Capture Area

Captures an image of a selected area of the screen. First the application window is selected, then the user drags the mouse over the area to capture.

Overwrite File: overwrites older existing images with the same file name.

For applications that change titles:

If the name of the application window title changes over time, insert a wild card character (\*) at the start or end of the window title. This ensures that the application is consistently found when running the Logic.

For example, to ensure the Microsoft Excel application is always found, use 'Microsoft Excel\*' or '\*Excel' or '\*Excel\*'.

When Secure Recording Mode is enabled:

Screen shots are disabled. If the user tries to save the image, a warning message will appear, reminding the user to ensure that the captured image does not contain sensitive data.

Related reference

[Clipboard command](#)

[Comment command](#)

[Error Handling command](#)

[Image Recognition command](#)

[Play Sound command](#)

[String Operation command](#)

[Variable Operation command](#)

## Send Email command

Use the Send Email command to automate tasks relating to sending emails.

Using the Send Email command, users can:

- Send multiple emails at the same time. Use a semi-colon between each email address.
- Include attachments with the email.
- Format the message in HTML.

Note: If using a Gmail/Yahoo account to send emails, enable the less secure app setting. Use the following links to modify your email account settings:

[https://myaccount.google.com/lesssecureapps?utm\\_source=google-account&utm\\_medium=web](https://myaccount.google.com/lesssecureapps?utm_source=google-account&utm_medium=web)

<https://login.yahoo.com/account/security?.scrumb=lUxncUHAsSN>

To send an email, follow these steps:

## Procedure

1. Click on the Tools menu, and select Options. In the Email Settings, type a Host Name and Port:

- Host: The SMTP Host enables users to send email from Automation Anywhere. This information is either obtained from the email provider, or from the configuration settings in the email program.
- Port: This setting defines the TCP/IP port that Automation Anywhere uses to send email.

Server	Host Name	Supported Ports
Outlook/Office 365	smtp-mail.outlook.com	25, 587
Gmail	smtp.gmail.com	465, 587
Yahoo	smtp.mail.yahoo.com	25, 465

Server	Host Name	Supported Ports
Hotmail	smtp.live.com	587

2. Double-click or drag the Send Email command to the Task Actions List pane.  
The Send Email window will open.
3. Enter the From, To, CC, and BCC email addresses.
4. Enter a Subject.
5. Add attachments:
  - Click the Attach button to attach any file type.
  - Click the Variables button to attach values of all variables.

This will append a text file that lists values of all the variables (System and User Defined) used in the TaskBot / MetaBot Logic.

- Note: The System Variable Excel Cell will not be attached as the values input are dynamic.
6. Select either Text or HTML for email format.
  7. Enter the message in the message box.
  8. Click Save.

#### Related tasks

[Launch Website command](#)  
[Email Settings](#)  
 Related reference  
[FTP / SFTP command](#)  
[Internet Connection command](#)  
[Web Recorder command](#)  
[SOAP Web Service command](#)

## Services command

Use the Service command to automate operations in Windows and application services including start, stop, pause, resume, or get status of services.

#### Get Service Status

Obtains the current status of a Windows or application service. Users can assign the status value to a variable

#### Start Service

Starts a Windows or application service.

#### Stop Service

Stops a Windows or application service that is currently running.

#### Pause Service

Pauses a Windows or application service that is currently running.

#### Resume Service

Resumes a Windows or application service that were previously paused using the Pause Service operation.

#### Related reference

[Active Directory command](#)  
[Printer Settings command](#)  
[SNMP command](#)

## SNMP command

Use the SNMP command to automate network management.

### Overview

Simple Network Management Protocol (SNMP) is used to locate the network management component on one or more computers and the managed component on multiple network devices.

The Automation Anywhere SNMP command offers powerful network management. Using this command 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.

#### Get

Retrieves data from an SNMP agent and assigns the return value to a variable.

#### Get Next

Browses entire hierarchy of management objects and assigns the return value to a variable.

#### Set

Modifies data on an SNMP agent.

Specify Value Type and Set Value.

#### Walk

Retrieves a sub-tree of management values using SNMP Get Next requests.

Specify Walk Type:

- Within: All variables in the sub-tree below the given OID are queried.
- All: Displays the variables that are equal to the specified OID for the given tree type structure.

#### Send Trap

Sends trap 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.

Specify Trap Type:

- Cold Start: Occurs when the SNMP agent initializes its configuration tables.
- Warm Start: Occurs when the SNMP agent re-initializes 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 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 must provide a Trap Specific Number for this option.

- [Inserting an SNMP Command](#)

Automates operations relating to network management.

#### Related tasks

- [Inserting an SNMP Command](#)

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Related reference

[Active Directory command](#)

[Services command](#)

[Printer Settings command](#)

## Inserting an SNMP Command

Automates operations relating to network management.

To insert an SNMP command, follow these steps:

### Procedure

1. Double-click or drag one of the SNMP operations to the Task Actions List pane.  
The SNMP window will open.
2. Select an SNMP operation: Get, Get Next, Set, Walk, or Send Trap.
3. Specify an agent and community details:
  - Agent: Specify an IP Address or host name.
  - Community: Specify a community string. This string is used for read-only access to a network element.
4. OID Specifications:
  - Object ID: Specify the IP Address or host name.
  - Data Type: Select from ASCII or Hex.
5. Specify Result:
  - Log File: View the SNMP log data in the selected log file.
  - Assign the value to an existing variable: Specify a variable value.
6. Optional: SNMP Advanced:
  - SNMP Version: Select a device version (V1, V2, or V3).  
Note: V3 enables users to select authentication levels to ensure a more secure environment.
    - Authentication Level: Choose from None, Authentication Only, or Authentication with privacy.
    - If None is selected, choose an Authentication Method (MD5 or SHA) and input a Password.
    - If Authentication with privacy is selected, choose a Privacy Method(DES or AES) and input the Private Key.
  - Timeout: Specify the response time in milliseconds for the action to wait for before generating an error.
  - Remote Port: Specify the TCP/IP port to be used for the Get request. The default is 161.
  - Retries: Specify the number of times to retry the message.
7. Click Save.

Related reference

[SNMP command](#)

## Stop Task command

Use the Stop Task command to stop an automation task from running.

An automation task can be stopped at any point by inserting a Stop Task command in the Task Actions. For example, a user can stop the task if a specific condition is met, such as when encountering a file larger than 100 MB.

---

Stop Task is a sub-command under the Task command. Expand Task to view its sub-commands.

Related reference

[Run Task command](#)

[Run Script command](#)

[Delay/Wait command](#)

## SOAP Web Service command

Use the SOAP Web Service command to access and exchange information over the internet.

### Overview

The Web Service command is used to implement SOA (service-oriented architecture) over the internet, so that multiple clients can consume web services through the Web, irrespective of the type of applications or platforms. By using this command, users can:

- Consume reusable application components as services, such as currency conversion, weather reports, and language translation.
- Connect to different existing applications and different platforms, irrespective of any underlying infrastructure requirements.

The Automation Anywhere Web Service establishes complete inter-polarity between clients/applications and the Web, supporting XML-based open standards, such as WSDL (Web Services Description Language), SOAP (Simple Object Access Protocol), and UDDI (Universal Description Discovery and Integration).

Tip: In the above mentioned command, press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

- [Using the SOAP Web Service Command](#)

Create a new web service to automate data access and exchange.

Related tasks

[Launch Website command](#)

[Send Email command](#)

Related reference

[Using Advanced Settings](#)

[FTP / SFTP command](#)

[Internet Connection command](#)

[Web Recorder command](#)

### Using the SOAP Web Service Command

Create a new web service to automate data access and exchange.

To create a new web service, do the following:

### Procedure

1. Double-click or drag the SOAP Web Service command to the Task Actions List.

- The SOAP Web Service window appears.
2. Enter a complete Uniform Resource Identifier (URI), or click Build URI to build a customized WSDL URI. The Build Web Service URI window appears.
  3. In the Build Web Service URI window, do the following:
    - a) Enter the WSDL URI.

You can enter the URI or insert a variable by pressing the F2 function key.

- b) Click Connect.

**11.3.2** If you have used a variable in the WSDL URI field, you are prompted to enter a value for the variable. If the variable is already assigned a value, the field is auto-populated in the pop-up. You can change (override) the auto-populated value.

After the connection is established, the Services, Port, Soap Versions, and Operations fields are auto-populated with options to select.

- c) **11.3.2** Select the following as required and optionally specify their parameters:
  - a) Select Services.
  - b) Select Port.

The default port is selected when you click Connect. Note that a port is not available for selection if the WSDL does not support a port.

- c) **11.3.2** Select Soap Versions.

The supported SOAP versions are 1.1 and 1.2. SOAP version 1.1 uses the "text/xml" content type, and SOAP version 1.2 uses the "application/soap+xml" and charset "utf-8" content types.

- d) Select Operations.

If the selected Operation has parameters, the parameters are populated in the table with their Name, Type, and Value. You can Add, Update, or Delete the parameters for a particular operation.

- d) Enable the Raw Data Parameter(s) option to specify the input in XML format.

e) **11.3.3** The Select URI for execution field enables you to select the SOAP service endpoint URI that is used to run a bot. Select from the following options:

- f) Default: To use the same service endpoint URI as the WSDL URI.
- g) Dynamic: To use the service endpoint URI that is read dynamically from the WSDL file during task execution.
- h) Static: To use the service endpoint URI that is generated at the time of creating a bot. In this case, the same service endpoint URI is used to run all the tasks. The variables are not evaluated during task execution.

Note: If you change the settings for an existing bot from the Default to Static service endpoint, you must Save the configurations to reload the associated WSDL and do not need to select Connect.

- i) Click Save.

4. Authentication Details: If you are using secure web services, enter the authentication details, including the user name, password, domain name, and client certificate.

Note: To enhance security, press the F2 key to insert a Credential Variable.

5. Enter Header Parameter(s): To automate a web service using two-stage authentication, specify the HTTP header parameter. Assign a variable (local or credential) to the parameter to support dynamic

- correlation of different web services. That is, allowing the token assigned to a variable from the header of one service to be passed to the header of another. Also, update or delete the existing parameters.
6. Test Output: Test the output data by clicking Test Output. You can test the output data from the specified URI.
  7. Provide Output details: Specify the file to which you want to save the output data. The output can be extracted as a whole output or as a partially extracted value. To aid the extraction, the following options are provided:
    - a) Whole Response: When this option is selected, the whole response is captured and stored in the selected variable.
    - b) Selected Response: When this option is selected, only the partial response is captured from the web service in the form of an XPath and this value is then stored to a variable.
  8. Select/View Response: To open an XML Viewer, click on this link. Select the appropriate node from the response body. The XML Path is automatically created. Store this output into a variable, which is then passed into the header parameter of another request. This is particularly useful for correlating two web services.

Related reference

[SOAP Web Service command](#)

Related information

[Credential variables](#)

## String Operation command

Use the String Operation command to manipulate text strings or extract part of a string and store it in a variable.

### Overview

The String Operations command is used for capturing then manipulating text strings, or extracting a portion of a text block from an email, a website, or an application window. The command enables users to search the string for particular phrases, compare two strings, convert a string to upper or lowercase, or obtain the length of a string. The resulting elements are stored in a list variable.

#### Before-After

Specifies a range of text to extract using logical operators.

- Specify the Source String.
- Use the Before and After text fields, and Logical Operators to refine the command:
  - AND: ensures the Before and the After conditions are met.
  - OR (default): ensures either the Before or After condition is met.
- Type the number of characters to extract in the text field.
- Optional: mark the Trim check box to remove blank spaces from the extracted text.
- Optional: mark the Remove Enter check box to remove paragraph spacing from the extracted text.
- Select either the Source string or the Empty string radio button to specify the return action if no match is found.
- Assign the output to a Variable.

#### Compare

Compares two strings and returns value of True or False.

- Specify String1 and String2.
- Refine the search by selecting the Match Case checkbox.
- Assign the output to a Variable.

**Find**

Locates a substring that exists within the source string.

- Match Case: Select this checkbox to refine the scope.
- Regular Expression: Select this checkbox if the Find field contains a regular expression. For example, to find all email addresses in the source, specify the following as a regular expression:  
`\b[A-Z0-9._%-]+@[A-Z0-9.-]+\.[A-Z]{2,4}\b`

**Join**

Joins all separate elements of list variables by defining the source string and a delimiter.

**Length**

Obtains the length of the string by specifying the source string.

**Lower Case**

Converts a source string to lower case.

**Replace**

Replaces a portion of a source string with a specified replacement string.

- Optional: specify the character position from which to begin.
- Optional: the number of times it is to be replaced.
- Select the Match Case check box to refine the scope.
- Select the Regular Expression check box if the string contains a regular expression.
- Assign the output to a Variable or the Clipboard.

**Reverse**

Reverses a specified source string.

**Split**

Splits a source string.

- Specify the Source String.
- Limit: Optional; specify a number of delimiters.
- Match Case: Select this checkbox to refine the scope.

**Substring**

Retrieves a substring.

- Specify the Source string.
- Start From (minimum value = 1).
- Optional: String Length (minimum value = 0).
- Optional: Assign the output to a variable selected from the drop-down menu.

**Trim**

Trims blanks and spaces from a specified source string.

**Upper Case**

Converts a source string to upper case.

**Related reference**

[Variable Operation command](#)

## System command

Use the System command to automate tasks relating to the computer system.

### Overview

The System command enables users to automate repetitive and routine tasks that relate to the computer system to save time and conserve energy.

#### Lock computer

Locks the computer. This operation is commonly used at the end of a task.

#### Logoff

Logs user off the computer. This operation is commonly used at the end of a task.

#### Shutdown

Turns off the computer.

Note: The Shutdown operation should only be inserted at the end of an automation task. Otherwise, the other commands in the task will not run.

#### Restart

Restarts the computer.

Note: The Restart operation should only be inserted at the end of an automation task. Otherwise, the other commands in the task will not run.

#### Related reference

[File and Folder command](#)

[Log-to-File command](#)

[Manage Window Controls command](#)

[Open Program/File command](#)

[Windows Actions command](#)

## Terminal Emulator command

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.

You can use the Terminal Emulator to run applications and access files on a remote machine with the same or different operating system.

The Terminal Emulator command enables you to connect to and automate tasks on another machine. You can use this command to access and control operations on a remote machine.

### Before you start

1. Establish a connection with a host machine using the Connect command.

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. The system uses the session name in other commands, so that you do not have to provide details of the host machine in those commands again. See [Using Connect command](#).

Important: If you use any other command from this package before establishing the connection, the system encounters an error.

2. Use the other Terminal Emulator commands to automate a task. For example, use the Get field command 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 command.

The following commands are available:

#### Connect

Establishes a connection with another machine. See [Using Connect command](#).

#### Control

Provides option to perform the following operations on the terminal console:

- Show Terminal: Shows the terminal screen. This command enables you to show the terminal screen when the Show Terminal Window option from the Connect command is not selected. It is useful when you want to display the terminal screen when a bot is performing certain tasks.
- Hide Terminal: Hides the terminal screen. This command enables you to hide the terminal screen when the Show Terminal Window option from the Connect command is selected. It is useful when you do not want to display the terminal screen when a bot is performing certain tasks.
- Clear Terminal: Clears the screen of the terminal.
- Set Cursor Position: Sets the position of the cursor on the screen of the terminal based on the row number and the column number you provide.

Note: You can enter a value between 1 to 999 to specify the row and column number where you want to set the cursor.

#### Disconnect

Terminates the connections with another machine.

#### Get All Fields

Gets values of all the fields from the terminal console and assigns them to an array variable for the TN3270 and TN5250 terminal types.

#### Get Field

Gets value of a field based on its Index or Name and assigns it to a variable for the TN3270 and TN5250 terminal types.

#### Get Text

Retrieves text from the terminal and stores it in a variable. Select from the following options:

- Last Line: Retrieves text from the last line of the terminal.
- All Lines: Retrieves text from all lines of the terminal.
- Line From-To: Retrieves text from the specified range of rows in the terminal. You must provide values in the Start Row and End Row fields to specify the range.
- Lines With Column Range: Retrieves text from the specified range of columns in the terminal. You must provide values in the Start Column and End Column fields to specify the range.

#### Set Field

Sets a value in a particular field. See [Using Set Field command](#).

#### Send Text

Enter text and send it to the terminal. See [Using Send Text command](#).

#### Wait

Inserts a Wait command to automate and trigger another action in the automated TaskBot / MetaBot Logic based on the terminal status. Supports the following terminal events:

- Wait till text appears

- Wait till text disappears
- Wait till cursor moves to position
- Wait till cursor moves out of position
- Wait till screen goes blank
- Wait till screen contains text
- Wait till terminal prompt appears
- Wait till terminal Ready State
  
- [Share Session Between TaskBot / MetaBot Logic](#)

The Share Session option is designed to achieve this. You can use this option in the Terminal Emulator command when you want to pass on the exact state of the application to the concurrently occurring TaskBot / MetaBot Logic and back.

Related reference

[Share Session Between TaskBot / MetaBot Logic](#)

Related information

[Credential variables](#)

## Share Session Between TaskBot / MetaBot Logic

The Share Session option is designed to achieve this. You can use this option in the Terminal Emulator command when you want to pass on the exact state of the application to the concurrently occurring TaskBot / MetaBot Logic and back.

Consider a scenario of concurrently running multiple tasks that use repetitive commands. For example, connecting to the same application multiple times from different tasks. The Share Session option gives you the ability to achieve this using a single task, which helps you to optimize your automation logic in the long run.

### How to 'Share Session'?

You can create a hierarchy of TaskBot / MetaBot Logic connected by a common thread -Share Session:

- Create a Main Task that connects you to the application with the Share Session option enabled/ selected using the Run Task command.
- Call other Sub Tasks that obtain the necessary data/information.

You do not need to disconnect from the application (terminal in this case) in the sub tasks; you only pass on the exact state of the application from the main task to the sub-tasks and back. This ensures that your bulky TaskBot / MetaBot Logic does not contain repetitive commands for connecting and disconnecting. This results in achieving the same results faster.

### Example: Share session to access and get data from applications installed on a mainframe terminal

The following is an hypothetical example to guide you through the Share Session option.

The assumption is that you have access to a mainframe terminal with various applications installed. Typically, you would access each application using separate sessions to connect to the terminal. So, each TaskBot / MetaBot Logic comprises of repetitive commands, such as connect and disconnect (to clear the earlier data session).

With the Share Session option, you can share your existing session state between the TaskBot / MetaBot Logic.

1. Create a Main Task named TE\_Share\_Main that calls the other Sub Tasks, namely, TE\_BMIS and TE\_CMIS. These sub-tasks obtain the required information from the various applications.
  2. In the TE\_Share\_Main main task, connect to the mainframe terminal using the Connect sub-command in the Terminal Emulator command.
  3. Enable the Share Session option.
  4. Include a Run Task command to call the TE\_BMIS sub-task. Ensure this task has used a set of sub-commands such as Send Text and Set Fields.
- Note: Since Share Session is enabled, the BMIS application starts in the same terminal that is connected to the TE\_Share\_Main main task.
5. Use the Get Text and Get Field commands to obtain the required information.
  6. To restore the original terminal state, use the Send Text command.

The sub-task ends here and the control is passed on to the main task.

7. Follow similar steps for the next TE\_CMIS sub-task, that is, connect using the Share Session option, then use the Send Text and Set Fields set of sub-commands, and get the information using the Get Text and Get Fields sub-commands.
8. Use the Send Text command to return to main task and restore the terminal to its original state.
9. Create the required number of sub-tasks and return to the main task using the Share Session option.
10. End the session in the main task by adding a Disconnect sub-command.

## Variable Operation command

Use the Variable Operation command to assign variables to a TaskBot / MetaBot Logic.

### Overview

The Variable Operation command enables admins to assign or reinitialize user specified variables. The type and source of a variable impact the assignment and reinitializing.

#### User Variables

Assigns or reinitializes an existing user variable to a value. The right side of the 'equal to' operator can be a regular operation.

Note: The operators ( ), /, \*, +, and - are supported. The left and right parentheses take precedence, and the operation within them is evaluated from left to right.

Values can be specified in English, German, French, Italian or Spanish.

#### System Variables

Resets the value of a system-created variable. Select from the following system variables:

- Email Cc
- Email From
- Email Message
- Email Received Date
- Email Received Time
- Email Subject
- Email To
- Error Description

- Error Line Number
- WorkItem
- WorkItemResult

Related concepts

[User defined variables](#)

[System Variables](#)

Related tasks

[Create new variables](#)

Related reference

[Using the Variable Manager](#)

Related information

[Using Variables](#)

## Web Recorder command

Use the Web Recorder command to automate internet-related tasks.

### Overview

The Web Recorder command enables users to record tasks to extract data from the web, download data, test web sites, extract source code, and more. Press the F2 key to insert a Credential Variable for enhanced security. Read more about [Assigning credential variables from credential lockers](#).

Note: It is recommended to search in the following sequence: By Caption, By Attributes and By Index.

**Open Browser**

Opens a window in Internet Explorer to a specified URL.

**Close Browser**

Complements the Open Browser operation by closing the active browser.

**Manage Web Controls**

Identifies properties of a UI control from a specified website. Users either input the URL or select an active window from a drop-down menu.

**Download File**

Downloads file from specified URL and saves to a file path.

**Extract Table**

Extracts table from a specified URL and optionally saves to a new CSV file or appends to an existing CSV file.

**Advanced View**

- Name the session.
- Mark the checkboxes to add the Page Title and Page URL properties to the command.
- Select tags from the drop-down menus to extract Tag Details to the CSV file.

**Find Broken Links**

Tests either the entire website or a specific web page for broken links, and saves the results as a CSV file to a specified location.

Select the encoding: ANSI, UNICODE, or UTF8.

**Extract Data**

Extracts data from a specified URL.

Use pattern based data extraction when the web entries follow a pattern. This feature recognizes the pattern and extracts the data, even if it spans several pages. The extracted data is saved to a CSV file.

#### [Navigate URL](#)

Opens a new window.

Mark the check-boxes to add the Page Title and Page URL properties to the command.

#### [Extract Source](#)

Extracts source of an element on a specified webpage, and assigns the value to a variable.

#### [Search By Caption](#)

Searches all open Internet Explorer windows for specified caption and occurrence frequency.

#### [Go back](#)

Navigates to previous page.

#### [Execute a JavaScript Function](#)

Executes JavaScript internally on a web page.

Tip: Ensure JavaScript has been enabled for Internet Explorer. If disabled, you will receive an access denied message. See the Microsoft Support section on enabling JavaScript in Windows.

#### [When Secure Recording Mode is enabled:](#)

No values, caption, or default texts are captured. No values are captured for Extract Data and Extract Multiple Data.

## Troubleshooting: Capture button is disabled for 'Extract Source' and 'Execute JavaScript'

The Capture button will be enabled for the following options:

- Extract Source: if the launched webpage has an iFrame.
- Execute JavaScript: if the launched webpage uses JavaScript.

#### Related tasks

[Launch Website command](#)

[Send Email command](#)

#### Related reference

[Editing a Web-only Task with Web Recorder Commands](#)

[Secure recording mode](#)

[FTP / SFTP command](#)

[Internet Connection command](#)

[SOAP Web Service command](#)

## Windows Actions command

Use the Windows Actions command to automate Windows-based actions, for example, activating, resizing, minimizing, maximizing, or closing an application window.

### Overview

The Windows Actions command automates tasks that involve manipulating windows. From the Select Window drop-down, users specify the window to be activated. Click Refresh if the application is running but unavailable.

#### [Activate Window](#)

Activates an application that is already running.

**Close Window**

Closes an active window.

**Maximize Window**

Maximizes an active window.

**Minimize Window**

Minimizes an active window..

**Resize Window**

Resizes an active window.

**Capture:** Click the button to retrieve the dimensions of the window.

**Get Active Window Title**

Assigns the active window title to a variable.

**Common Errors**

Users can encounter the following error when using the Window Actions Command > Activate Window:

Cannot find window or application titled <window title> that was open during recording.

Possible Reasons:

- The Window/Application that was open when recording the TaskBot / MetaBot Logic, might be closed.
- The Window/Application no longer exists.

Possible Solutions:

- Launch/Open Window/Application and run the TaskBot / MetaBot Logic.
- Check whether the Window/Application exists in its destination folder/path.

## Workload command

Use the Workload command to manage complex workflow by configuring a bot to perform work items from multiple queues.

To insert a work item or to set a work item result, a user must have Queue participant privileges.

**Insert Work Item**

Process a Work Item from one queue and push the outcome as Work Item into another Queue.

**Set Work Item Result**

Displays the result or output of an active work item.

Combine with the system variable \$WorkItemResult\$ to display the result or output of a work item for further processing. For example, the result can be logged to a file for future reference, or shared with a customer through a chat application or Chatbot.

- [Insert work item command](#)

Use this command to add a new work item into a queue.

- [Set work item result command](#)

Use this command to view the result of a workload automation that was added using the Insert work item command.

**Related concepts**

[Manage workload queues](#)

## Insert work item command

Use this command to add a new work item into a queue.

### Prerequisites

If you have not done so already, review the required conditions to use the [Workload command](#).

To add a work item to a queue, follow these steps:

### Procedure

1. Double-click or drag the Insert Work Item command to the Task Actions List pane.  
The Workload window appears with the list of queues for which you have a Participant privilege.
2. Select the desired queue name from the list to insert as a work item into a queue.  
The system displays the list of attributes and their data type under Name and Data Type columns.  
These attributes are from the queue category associated with the selected queue.
3. Type data into the Value column.
  - You can sort and filter the data on Name, Data Type, and Value columns.
  - You can also assign a variable value to these attributes by pressing the F2 key and select the desired variable name from the list.

Note: Use UTC format for date Data Type (YYYY-mm-dd 00:00:00).
4. Click Save.  
The command is added to the bot.
5. Add more data using the Insert Work Item command.  
Once you have added the required data, save the bot and upload it to the Enterprise Control Room for further processing and deployment.  
Note: You should upload the bot to the Enterprise Control Room and create an automation to consume data from a queue. You cannot run the bot directly from your Enterprise client.

#### Related tasks

[Set work item result command](#)

#### Related reference

[Workload command](#)

## Set work item result command

Use this command to view the result of a workload automation that was added using the Insert work item command.

### Prerequisites

If you have not done so already, review the required conditions to use the [Workload command](#).

The Set work item result command combined with the system variable \$WorkItemResult\$ enables a user to display the output or result of a work item for further processing. For example, the result can be logged to a file for future reference and/or shared with a customer via a chat application or Chatbot.

### Procedure

1. Double-click or drag the Set work item result to the Task Actions List pane.

The Workload window appears with the list of queues for which you have a Participant privilege.  
This command can be used only if the bot in which it is being added is linked to a Queue category.

2. Press the F2 key to insert a variable.
3. Select the system variable \$WorkItemResult\$ which is added to the command window.
4. Click Save.

#### Related tasks

[Insert work item command](#)

#### Related reference

[Workload command](#)

## XML command

Use the XML command to process XML information that is generated from web services and cloud computing applications.

### Overview

The XML command supports sessions, node editing, and Xpath expression execution, based on a tree structure of an XML document. The command enables the automated TaskBot / MetaBot Logic to navigate the tree and make selections based on various criteria.

The XML command enables users to capture data that has XML formatting and save it to a specified location.

#### Start XML Session

Specifies the session name and data source (a file or text).

#### End XML Session

Complements the Start XML Session operation by closing an open XML session.

#### Insert Node

Specifies node name and value. The location of the node is based on the position of the XPath Expression.

Specifies action if node name is present (Insert It Anyways, Skip It, or Overwrite It) and where to insert node location (Beginning, End, Before Specific child node, or After Specific child node).

Note: If Before Specific child node or After Specific child node is selected, specify child node name.

#### Delete Node/Attribute

Deletes a node or attribute from the XML file by specifying the XPath Expression.

#### Update Nodes

Updates nodes in a session at the position that is specified for the XPath Expression.

Update Attributes: Mark the checkbox to add, update, or delete attributes.

#### Validate XML Document

Validates session data using XML schema files (.xsd), internal Document Type Definitions (DTDs), or if the session data is Well Formed.

Validation output (VALID or INVALID) can be assigned to a variable. If an error occurs during validation, it is stored in the system variables named: \$Error Line Number\$ and \$Error Description\$.

#### Get Node(s)

Retrieves the value(s) of a single or multiple node(s) in the session data by specifying the XPath Expression.

- Get Single Node: Retrieves the value of a single node or attribute from the session data, at the position specified in the XPath expression. The value is assigned to a variable.
- Get Multiple Nodes: Retrieves values from multiple nodes in the session data, using Text value/XPath expression/Specified attribute name, based on the specified XPath expression.

The value is assigned to a system variable named `$XML Data Node (Node name)$`, which can be used in conjunction with a LOOP command. For example, a Loop command can be used to search each node in an XML data set.

#### Save Session Data

Saves the session data to a variable.

Write XML Data: Mark the checkbox to save the data to a specified location.

The data is saved in an XML file encoded in UTF-8 format.

#### Execute XPath Function

Executes an XPath function and stores the results in a variable.

## Using Variables

Variables are used in conjunction with certain commands to build automated tasks. This is the landing page for information about variables in Automation Anywhere.

### Why Use Variables?

Variables are storage locations for known or unknown information.

When building automated tasks, variables play an important role in maintaining or calculating information.

Variables can help you in a number of ways, from fetching online data to transferring data between applications, such as Microsoft Excel.

Automation Anywhere is designed with various types of variables which can be defined for each task.

These are known as local variables. It has pre-defined system variables available for all tasks.

The topics in this section will help you to understand the types of variables, how to use them, and when to use them.

### When to Use a Variable?

As you build automation tasks, the scripts that are generated can lend themselves to using variables to track or modify the value of a field or data point. For example, if you want to loop through a set of data in a CSV file, you can use a variable to copy the first row, paste it to another application, move to the second row, and so on.

All actions that you take in a task can support the use of variables. These actions can include:

- Selecting windows
- Opening programs
- Working with files, folders, keystrokes, spreadsheets, loops, and more.

- [Using the Variable Manager](#)

The Variable Manager displays the local variables that are defined for a particular task. You can use the Variable Manager to add, modify, and copy variables within automation tasks.

- [Types of Variables](#)

This topic describes the types of variables you can define and use when building automated tasks.

- [Credential variables](#)

Credential variables securely store sensitive information that will be used when running automation tasks.

- [Working with Variables](#)

These topics describe how you can create and modify variables, as well as take other actions on variables with your automation tasks.

## Using the Variable Manager

The Variable Manager displays the local variables that are defined for a particular task. You can use the Variable Manager to add, modify, and copy variables within automation tasks.

In the Workbench, click the Variable Manager tab on the left side.

Use the Variable Manager to perform any of the following actions with variables:

- Copy
- Copy All
- Paste
- Add a new variable
- Edit a variable
- Delete a variable

When you click the Show System Variables link, the Variable Manager displays details about all system variables that are available for each task.

When you click the Queue Category link, the Select Queue Category form is launched, in which you can select any of the queue categories added by the Queue owner in the Enterprise Control Room that you are connected with.

When you use the Variable Manager for the first time, you will see that Automation Anywhere provides two pre-defined user variables for your use:

1. my-list-variable (type: List)

This variable provides a container for a list of values.

2. Prompt-Assignment (type: Value)

This variable provides a container for a single value.

Note: 11.3.3

- For a protected bot you cannot:

- Add any new variables or edit existing variable attributes using Add and Edit options.

- Paste variables in the protected bot that are copied from another TaskBot.
- Delete any existing variables using the Delete option.
- For a protected bot the Queue Category link in the Variable Manager is disabled.

Related tasks

[Create new variables](#)

Related reference

[Types of Variables](#)

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

[Watching Variables](#)

Related information

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## Types of Variables

This topic describes the types of variables you can define and use when building automated tasks.

There are three types of variables in Automation Anywhere: User (local) Variables, System Variables, and Credential Variables.

For all Automation Anywhere commands, variables are supported in fields that have the light bulb  symbol present. Use the F2 function key to open the list of variables that are applicable to that field.

### User (Local) Variables

User variables are defined by an automation user, and used for a particular task or set of tasks. A user variable can hold a single value or multiple values.

For new automation tasks, two variables are pre-defined for your use:

- my-list-variable (type: List)
- prompt-Assignment (type: Value)

After you create a user (local) variable, you can reinitialize it or assign it when a task runs.

### System Variables

System variables are pre-defined variables that are provided by Automation Anywhere. System variables are available for use in all automation tasks.

### Credential Variables

Available in Enterprise edition only from version 10.2.1

Credential variables securely store sensitive information that will be used when running automation tasks.

Credential variables can be used only by the Bot Creator and only in Command fields that require a credential input.

These credentials are defined by the Enterprise Control Room administrator in the form of Credential Keys that comprise a set of Attribute Values and are securely stored in a centralized location - the Credential Vault.

Unlike User and System variables, you cannot view Credential variables in the Variable Manager. They are visible in the Insert Variable window while creating a task with commands that support Credential Variables. Refer list of Commands that support Credential variables in [Credential variables](#).

- [User defined variables](#)

User variables are defined by an automation user, and used for a particular task or set of tasks. A user variable can hold a single value or multiple values.

- [System Variables](#)

System variables are pre-defined variables that are provided by Automation Anywhere. System variables are available for use in all automation tasks.

Related tasks

[Create new variables](#)

Related reference

[Reading Variables from an External File](#)

[Reinitializing Variables](#)

[Using the Variable Manager](#)

[Watching Variables](#)

Related information

[Credential variables](#)

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## User defined variables

User variables are defined by an automation user, and used for a particular task or set of tasks. A user variable can hold a single value or multiple values.

There are two categories of variables:

1. Analytics Variables are those variables that are defined by the Bot Creator to collect data for analysis. Such variables are marked for Analytics while creating variables. These are displayed in the Variable Manager for the respective TaskBot under Analytics Variables.
2. Local Variables are those variables that are defined by the Bot Creator for a particular task. These are displayed in the Variable Manager for the respective TaskBot and MetaBot Logic under Local Variables.

Each user variable has a source . This source varies from direct assignment to reading values from files, such as text files, Excel or CSV files, or a database.

Note: Analytics and Local Variables can be created only if you have bot creation privileges.

- [Value Type variables](#)

Use this variable to hold a single data point and use it in multiple places.

- [List Type Variables](#)

You can use a list type variable when you need to retrieve multiple values, one by one. It is basically one dimensional placeholder for data.

- [Array Type Variables](#)

An array variable is a two-dimensional variable that holds multiple values in a table of rows and columns. Arrays are very powerful for creating staging areas for data that need to be retrieved by your process as it runs.

- [Random Variables](#)

You can create two types of random variables: string and numerical.

- [Pre-Defined User Variables](#)

Automation Anywhere provides two user variables that are pre-defined for your use.

- [Dictionary Type Variables](#)

A dictionary variable is a collection of key-value pairs, in which each key is mapped to a value. It is similar to an entry in a dictionary where each word has a corresponding definition or an explanation. The key is similar to the word and the value is its definition or an explanation.

- [Restoring Deleted Variables](#)

If you delete one or both of the pre-defined user variables (listed below), you can restore them.

Related tasks

[Create new variables](#)

Related reference

[Reinitializing Variables](#)

[Using the Variable Manager](#)

Related information

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## Value Type variables

Use this variable to hold a single data point and use it in multiple places.

### When/Why To Use a Value Type variable

This "placeholder" value can represent either text or numeric data.

After you create the variable, you can use it by inserting the variable in several of the Workbench commands. When the value of the variable is modified, this value is reflected in any subsequent commands that are run in the TaskBot / MetaBot Logic.

You can mark a Value Type variable as either:

1. Log to Analytics - to upload data to Bot Insight dashboard for data analysis. By default, this is enabled.

Note: If your automation is migrated from an earlier version to Enterprise Enterprise client 11, you can select the option manually by editing the variable. Such variables will not be selected for analysis by default.

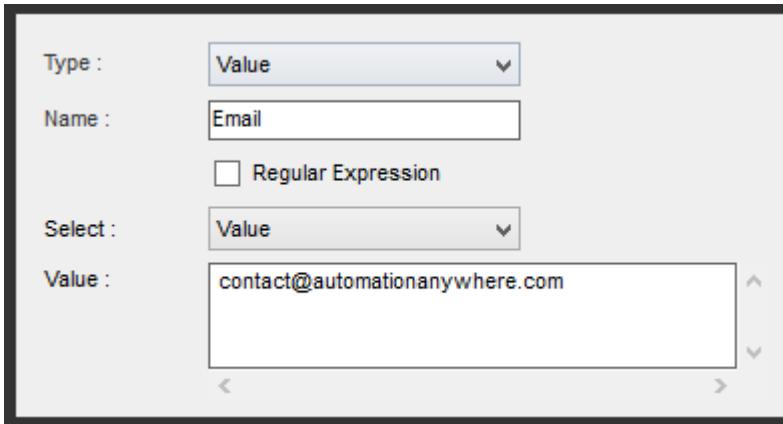
2. Regular Expression - to use the variable in automation that require pattern-based searches in files, folders and window title commands.

Note:

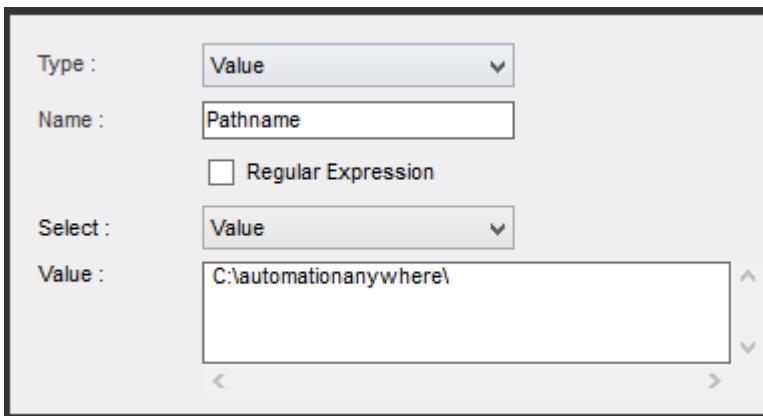
- You can input only the first line of text in the Value text box.
- Regular Expression in variables can be used in commands that support wild cards. For instance, you can use regular expressions in certain sub-commands of Files/Folders; namely Copy, Delete, Zip and Print Multiple Files/Folders.

## Examples of Value Type variables:

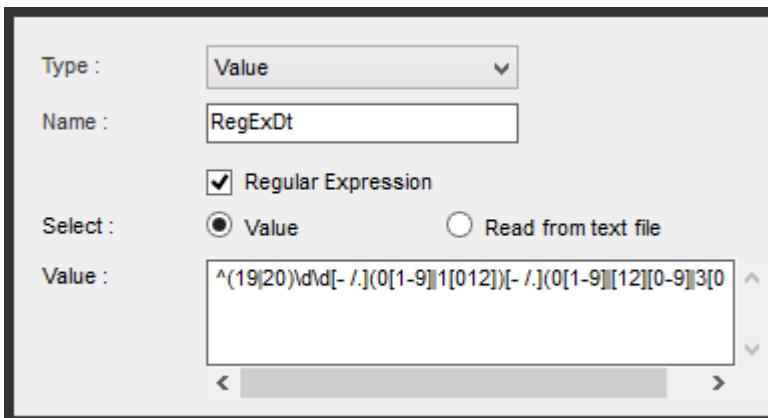
- Name: ValueDB, Value: oracle
- Name: email, Value: contact@automationanywhere.com



- Name: Pathname, Value: C:\Automationanywhere\



- Name: RegExDt, Value: ^(19|20)\d\d[- /.](0[1-9]|1[012])[- /.](0[1-9])[12][0-9]3[01]\$



Common examples of names you can use for Value Type variables include:

Pathname, CounterValue, DatabaseName, email, etc.

## Commands that support regular expression

- Delay/Wait command
- File and Folder command
- Image Recognition command
- Keystrokes command
- Mouse command
- Manage Window Controls command
- OCR Command
- Screen Capture command
- Windows Actions command

## How to Create a Value Type variable

You can create value type variables in two ways: using direct assignment or using a file.

- [Create a Value Type variable using file assignment](#)

Create a value type variable using file assignment when the value of the variable needs to be retrieved from a text file while a task is running.

- [Create a Value Type variable using direct assignment](#)

Create a value type variable using direct assignment when the values are generally known and need to be retrieved repetitively for different commands in the task.

Related reference

[List Type Variables](#)

[Array Type Variables](#)

[Random Variables](#)

[Pre-Defined User Variables](#)

## Create a Value Type variable using file assignment

Create a value type variable using file assignment when the value of the variable needs to be retrieved from a text file while a task is running.

Your task can read the file and change the value of the variable, reassigning the value at each data point in the file. To create a value type variable using file assignment, follow these steps:

### Procedure

1. Determine the text file you will use for assigning values.

In the text file, ensure that the variable name exists, followed by an '=' operator. This ensures correct assignment of values.

For example, Variable Name: Website Text file content: website = automationanywhere.com

2. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.

3. Click Add.  
The Add Variable window is displayed, with the Create New Variable option selected.
4. Select type Value.  
Generally, this is the default selection.
5. Enter a name for the variable.  
The name must begin with an alphabetic character and cannot contain spaces.
6. Select the Read from text file radio button.
7. In the Select File field, browse to the file or type the file path for the required text file.  
Use the Open File button to view the selected text file.
8. Click Save.  
After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

## Create a Value Type variable using direct assignment

Create a value type variable using direct assignment when the values are generally known and need to be retrieved repetitively for different commands in the task.

This makes the task flexible and easy to use. To create a value type variable using direct assignment, follow these steps:

### Procedure

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
2. Click Add.  
The Add Variable window is displayed, with the Create New Variable option selected.
3. Select type Value.  
Generally, this is the default selection.
4. Enter a name for the variable.  
The name must begin with an alphabetic character and cannot contain spaces.
5. Select the Value radio button.  
This is the default.
6. Specify an initial value.  
This value can be character or numeric.
7. Click Save.  
After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

## List Type Variables

You can use a list type variable when you need to retrieve multiple values, one by one. It is basically one dimensional placeholder for data.

### When/Why To Use a List Type Variable

Common uses of list variables include:

- Sending email to multiple recipients

- Passing different values inside of a loop
- Searching multiple web addresses

The values can represent either text or numeric data.

After you create the variable, you can use it by inserting the variable in several of the Workbench commands. When the value of the variable is modified, this value is reflected in any subsequent commands that are run by the task.

## How to Create a List Type Variable

You can create list type variables in two ways: using direct assignment or using file assignment.

### Direct Assignment

Create a list type variable using direct assignment when the values of the variable are fixed and need to be retrieved one-by-one as the task runs.

To create a list type variable using direct assignment, follow these steps:

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
2. Click on the Add button. The "Add Variable" window is displayed, with the "Create New Variable" option selected.
3. Select type "List".
4. Enter a name for the variable. The name must begin with an alphabetic character and cannot contain spaces.
5. Select the "Value" radio button. This is the default.
6. Specify list values in the field provided. The values can be character or numeric.
7. Click the "Add to List" button.
8. Repeat steps 5 and 6 to complete the list.
9. Click Save.

You can use the "Make Random" checkbox to call the values randomly when the task runs.

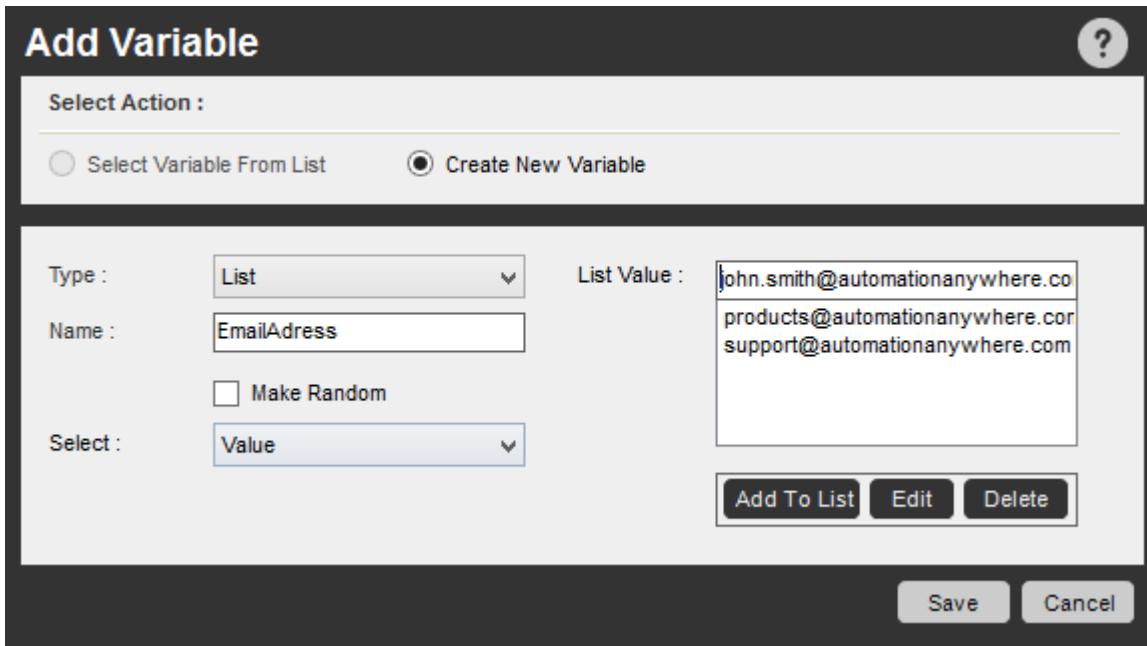
If you leave the option unchecked, the values will be retrieved in the order you have entered them.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

Example of List Type Variable:

Name : Email Address

Values: products@automationanywhere.com, support@automationanywhere.com,  
john.smith@automationanywhere.com



## File Assignment

Create a list type variable using file assignment when the values for the variable need to be retrieved from a text file while a task is running.

The text file is used to define the list variable. Loop commands make it easy to process the list of values.

Common Use Case: Extract data to a text file

To create a list type variable using file assignment, follow these steps:

1. Determine the text file you will use for assigning values.

In the text file, ensure that the variable name exists, followed by an '=' operator, and a list of comma-separated values.

Example text file with list of values: Variable Name: products

The products.txt file contains:

```
products = automation, testing, PI, SAP-automation, ERP-automation
```

2. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
3. Click on the Add button. The "Add Variable" window is displayed, with the "Create New Variable" option selected.
4. Select type "List".
5. Enter a name for the variable. The name must begin with an alphabetic character and cannot contain spaces.
6. Select the "Read from text file" radio button.
7. In the Select File field, browse to the file or type the file path for the required text file. Use the Open File button to view the selected text file.
8. Click Save.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

**Add Variable**

Select Action :

Select Variable From List     Create New Variable

Type : **List**

Name : **Products**

Make Random

Select : **Read from text file**

Select File : **D:\My Documents\Products.txt**

**Browse**

**Open File**    [How to use?](#)

**Save**    **Cancel**

## Array Type Variables

An array variable is a two-dimensional variable that holds multiple values in a table of rows and columns. Arrays are very powerful for creating staging areas for data that need to be retrieved by your process as it runs.

### When/Why To Use an Array Type Variable

Common uses of array variables include:

- Extracting data from web pages
- Extracting many rows of data from an Excel spreadsheet or a database
- Read or write data from/to a legacy system, an ERP system, or another application
- Filling out order forms with different fields from Excel to Database

The values can represent either text or numeric data.

After you create the variable, you can use it by inserting the variable in several of the Workbench commands.

When the value of the variable is modified, this value is reflected in any subsequent commands that are run by the task.

### How to Create an Array Type Variable

You can create an array type variable in four ways:

- Using direct assignment
- Using a text file
- Using an Excel or CSV file
- Using a database

## Direct Assignment

Create an array type variable using direct assignment when you want the values of the variable to be defined directly to the variable.

To create an array type variable using direct assignment, follow these steps:

1. In the Workbench, click on the Variable Manager tab on the right side.
2. Click on the Add button. The 'Add Variable' window is displayed, with the 'Create New Variable' option selected.
3. Select type 'Array'.
4. Enter a name for the variable. The name must begin with an alphabet and should not contain spaces.
5. Select how you want the array to be created. Default selection is 'Value' which indicates that you will define the values of this variable directly in it.
6. Specify the number of rows and columns in the field provided. Default values are 1 X 1.
7. Click the Initialize Values button. The Array Value Details window is displayed based on the rows and columns provided in step 6.
8. Enter the values for each cell.
9. Click the Save button to save the values.
10. Click the Save button again to save the array variable.

You can modify the array dimensions using the Add Row, Add Column, Delete Row, and Delete Column buttons.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

## Text File Assignment

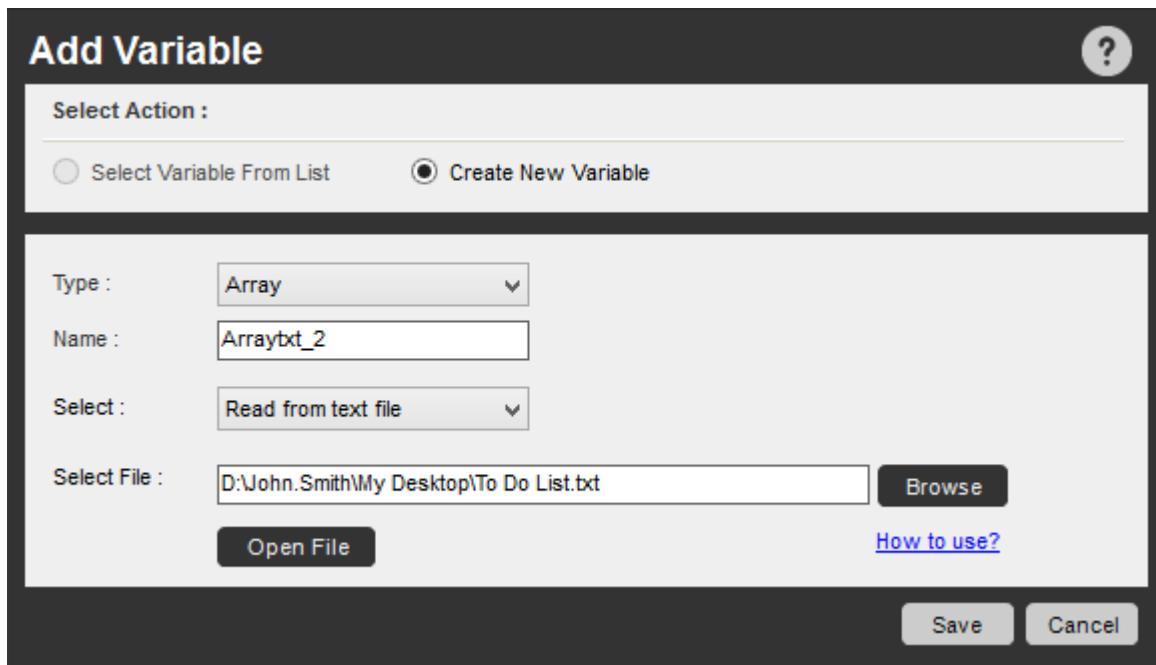
Create an array type variable using text file assignment when you want to read values from a specified text file into the array variable while the task is running. The text file is used to define the array variable.

To create an array type variable using text file assignment, follow these steps:

1. Determine the text file that you will use for assigning values.
2.
  - For Rows enter the data in a new line.
  - For Columns use comma separated values.
  - Example: sports\_team.txt
3. In the Workbench, click on the Variable Manager tab on the right side.
4. Click on the Add button. The 'Add Variable' window is displayed, with the 'Create New Variable' option selected.
5. Select type 'Array'.

6. Enter a name for the variable. The name must begin with an alphabet character and should not contain spaces.
7. Select 'Read from text file' from the dropdown.
8. In the Select File field, browse to the file or type the file path for the required text file. Use the Open File button to view the selected text file or to modify it.
9. Click Save.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.



## Excel or CSV File Assignment

The Automation Anywhere Web Recorder and Excel commands extract data to Excel and CSV formats. You can use these files to create an array variable that might be used for entering or manipulating data for computing or analysis.

Automation Anywhere provides a range of options for retrieving subsets or partial sections of the data.

Create an array type variable using an Excel or CSV file assignment when you want the values of the variable to be retrieved from an Excel or CSV file.

To create an array type variable using Excel or CSV file assignment, follow these steps:

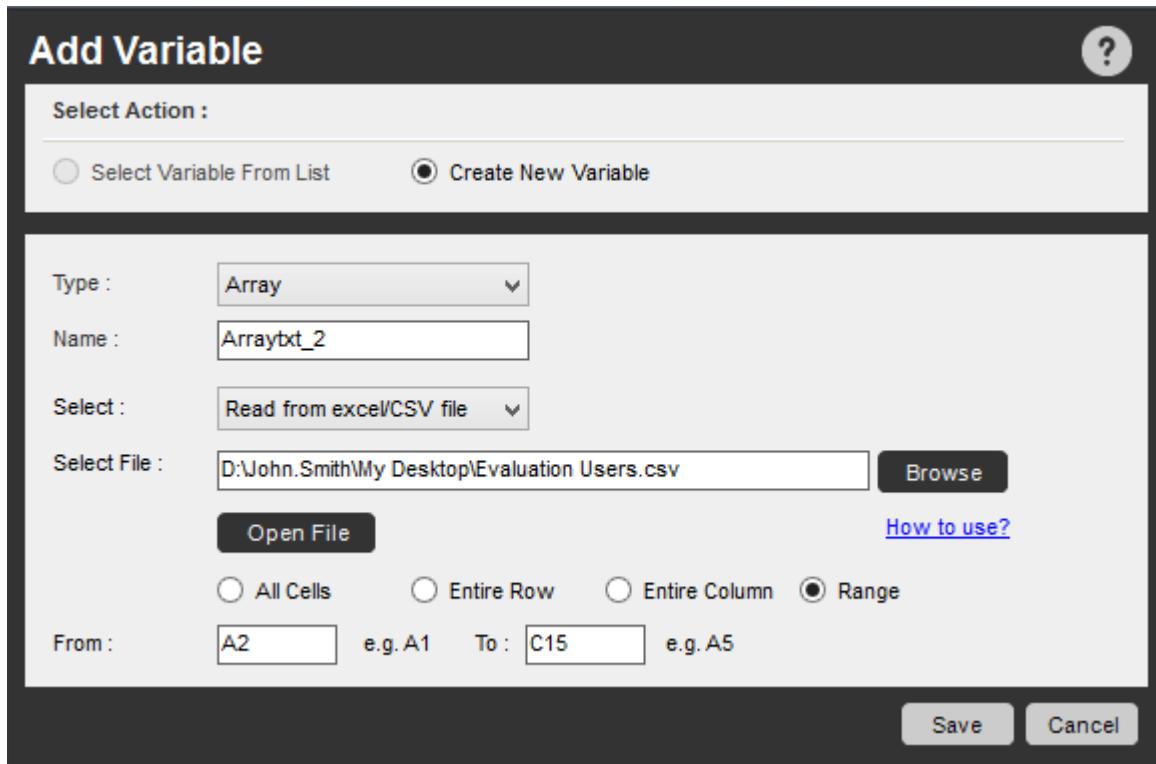
1. In the Workbench, click on the Variable Manager tab on the right side.
2. Click on the Add button. The 'Add Variable' window is displayed, with the 'Create New Variable' option selected.
3. Select type 'Array'.
4. Enter a name for the variable. The name must begin with an alphabet and should not contain spaces.
5. Select 'Read from Excel/CSV file' from the dropdown.
6. Browse and select the required file.
7. Select the options you want for reading values from specific locations in the file. You can choose from:
  - All cells

- Entire Row
- Entire Column
- Range

Note: If you select Range, specify the From and To. You can use the Open File button to view the selected text file or to modify it.

8. Click Save.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.



## Using a Database

You can define an array variable with values derived from the result of a database query. The array variable is created with dimensions that are determined as a result of running the query.

To create an array type variable using a database query, follow these steps:

1. In the Workbench, click on the Variable Manager tab on the right side.
2. Click on the Add button. The 'Add Variable' window is displayed, with the 'Create New Variable' option selected.
3. Select type 'Array'.
4. Enter a name for the variable. The name must begin with an alphabet and should not contain spaces.
5. Select the 'Read from database' from the dropdown.
6. Specify the database connection string details using Browse. Clicking on browse opens the Data Link properties dialogue box. Use it to test and create a valid connection string for the database of your choice.
7. Enter Select Query by typing the entire database query.
8. Click Save.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.

**Add Variable**

Select Action :

Select Variable From List     Create New Variable

Type : **Array**

Name : **OracleEmpData**

Select : **Read from database**

Connection String : **Provider=MSDASQL.1** **Browse**

Enter Select Query : **Select Employee\_Name, Employee\_Email from em** [How to use?](#)

**Save** **Cancel**

Once you have created array variables by reading data from various sources, use Loop command to easily process them in your automation task.[Using Array Variable in Loop Command](#).

## Random Variables

You can create two types of random variables: string and numerical.

Random variables are useful when you need to generate a random, repetitive string or numerical set. The values are generated when you run the task.

Common use cases:

- String: Generating test data as input for fields or forms
- Numerical: Generating ID numbers in batch

After you create the variable, you can use it by inserting the variable in several of the Workbench commands.

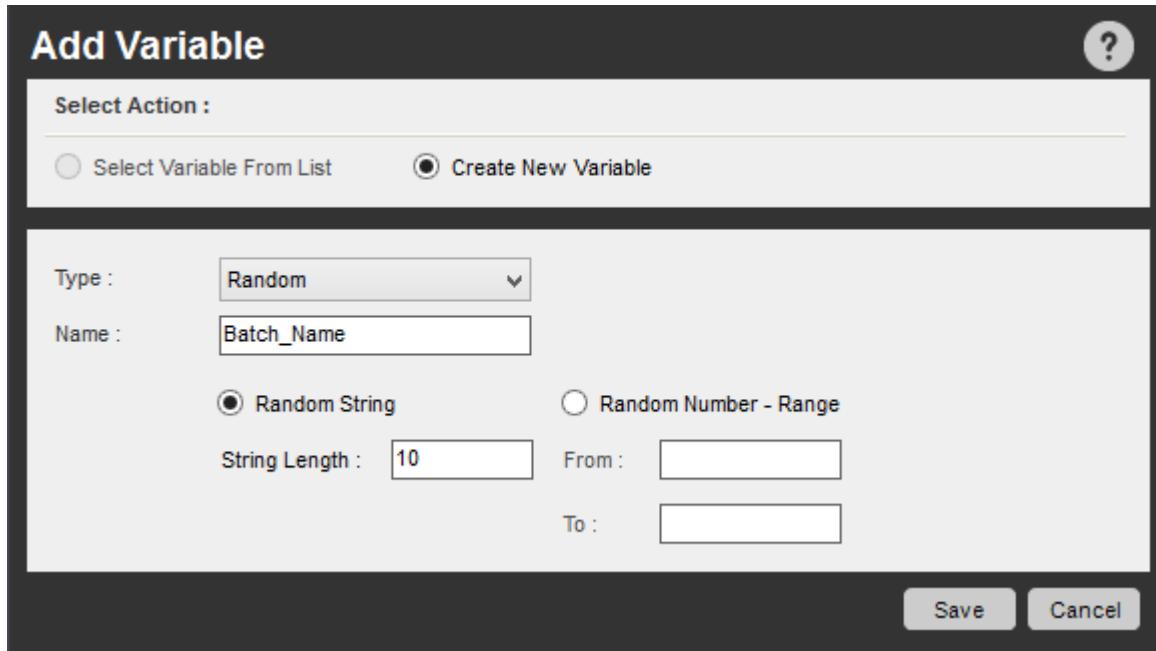
### How to Create a Random Type Variable

#### Creating a Random String Variable

To create a random string variable, follow these steps:

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.

2. Click on the Add button. The "Add Variable" window is displayed, with the "Create New Variable" option selected.
3. Select type "Random."
4. Enter a name for the variable. The name must begin with an alphabetic character and cannot contain spaces.
5. Select the "Random String" radio button. This is the default.
6. Specify the string length in the field provided. The value cannot exceed 255.
7. Click Save.



## Creating a Random Numeric Variable

To create a random numeric variable, follow these steps:

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
2. Click on the Add button. The "Add Variable" window is displayed, with the "Create New Variable" option selected.
3. Select type "Random".
4. Enter a name for the variable. The name must begin with an alphabetic character and cannot contain spaces.
5. Select the "Random Number - Range" radio button.
6. Specify the "From" and "To" values for the range.
7. Click Save.

**Add Variable**

Select Action :

Select Variable From List     Create New Variable

Type : Random

Name : ID\_No

Random String     Random Number - Range

String Length : 10    From : 1001  
To : 1999

Save    Cancel

## Pre-Defined User Variables

Automation Anywhere provides two user variables that are pre-defined for your use.

The pre-defined variables are:

- my-list-variable (type: List)

This variable provides a container for a list of values. For more details see [List Type Variables](#)

- Prompt-Assignment (type: Value)This variable provides a container for a single value. For more details see [Value Type variables](#) .

These variables can be used quickly by pressing the F2 key.



## Dictionary Type Variables

A dictionary variable is a collection of key-value pairs, in which each key is mapped to a value. It is similar to an entry in a dictionary where each word has a corresponding definition or an explanation. The key is similar to the word and the value is its definition or an explanation.

Within the dictionary, the key and value can be used wherever a string is used (in loops, commands, parameters, MetaBots, and so on).

The following table represents the use of Dictionary variable when used to send/ receive data to/from MetaBot Logic.

Variable Type	Dictionary variable usage	Description
Array		<p>A single element within the Dictionary variable.</p> <p>For example, \$book ("page1") \$ - where "book" is the name of the dictionary variable and "page1" is the key</p>

Variable Type	Dictionary variable usage	Description
		whose value is used to send or receive data to or from the Array.
List		A single element within the Dictionary variable indicated by a specific key.  For example, \$book("page1")\$ - where "book" is the name of the dictionary variable and "page1" is the key whose value is used to send or receive data to or from the List.
Dictionary		The complete Dictionary variable.  For example, \$book\$ - where book is the name of the dictionary variable.

Rules for Dictionary Key:

- It is not case sensitive
- It is unique within each dictionary variable
- It must contain at least one character other than spaces
- It can be referenced using a string or a value variable
- It must not contain a dollar sign (\$)
- It must not contain leading or trailing white spaces

Supported Variable Manager operations:

- Add a key
- Add a key and a value pair
- Edit a key
- Edit a value for a key
- Delete a key and the associated value
- Delete a key

Note:

- If the same key with a new value is added to the Dictionary variable, then, when saving, the previous value is overwritten by the new value.
- Dictionary variables cannot be passed between TaskBots.
- Any entries with no key or only blank spaces in the key are automatically deleted during the initialization process.

Rules for CSV files:

- The file extension is .csv
- Use one key-value pair per line
- In the key, if you have leading or trailing spaces, they will be trimmed when saving into the Dictionary variable

- If the same key appears multiple times, only the last processed value is assigned to that key
- If the value spans over multiple lines, it must be enclosed in double quotes
- If the value includes comma(s), it must be enclosed in two double quotes
- If the text within the value contains double quotes, then double quotes must be presented in the value without spaces, for example, if the actual text reads: He said,"I have to go!", and disappeared in a flash, then, it must be presented as: "He said,""I have to go!""", and disappeared in a flash."

The following list represents a list of error conditions when processing a .csv file. The processing will continue to the next line while logging an error along with the associated line number.

- A line without a key
- A line with only spaces as a key
- A line with only a key without a comma
  - The key will be added to the Dictionary variable with a null value
- A line with multiple commas
  - The text before the second comma will be entered into the variable as a valid key-value pair and the rest of the text will be ignored.

#### Note:

If reinitialization of an existing dictionary fails then the previous key-value data of the dictionary is preserved.

#### Related reference

[Types of Variables](#)

[Variable usage considerations](#)

[Working with Variables](#)

[Using the Variable Manager](#)

## Restoring Deleted Variables

If you delete one or both of the pre-defined user variables (listed below), you can restore them.

These include:

- my-list-variable (type: List)
- Prompt-Assignment (type: Value)

To restore either or both of these variables, follow these steps:

1. Open the Variable Manager.
2. Click on the Add button to display the Add Variable window.
3. Click on the "Select Variable from List" radio button.
4. Check the box next to the pre-defined variable that you want to restore, and click on Save.

Note: You cannot restore user variables that you create and then delete.

## System Variables

System variables are pre-defined variables that are provided by Automation Anywhere. System variables are available for use in all automation tasks.

---

System variables are populated during command execution.

System Variable types include:

- [Date and Time System Variables](#) : System-related date and time variables.
- [System Variables - Loop](#): Useful in conjunction with Loop commands.
- [Excel System Variables](#) Useful for Excel automation.
- [Email System Variables](#) Useful for Email automation.#
- [Trigger Variables](#): Useful in conjunction with triggers.
- [PDF System Variables](#): Useful for use with PDF command.\*
- [System Variables - Specific to System Settings/Parameters](#) Variables specific to a particular client machine.

After system variables are used in a task, you can view their progress while running a task.

- [Date and Time System Variables](#)

You can use the set of Date and Time system variables to insert or monitor the current date and time of a system as your automation task runs.

- [System Variables - Loop](#)

A Loop system variable complements the Loop command and works within the scope of a defined loop. Most loop variables have no value when used outside of loops.

- [Email System Variables](#)

You can use Email system variables within an Email automation task to manage your email automation loop. These variables are specific to the scope of the loop that processes each email message for the server.

- [Excel System Variables](#)

You can use Excel System Variables to manage Excel automation processes. These variables are specific to the scope of the Excel command.

- [Trigger Variables](#)

You can use a trigger system variable anytime you work with an automation task that is launched with a trigger.

- [PDF System Variables](#)

You can use the PDF system variables with the PDF Integration command.

- [System Variables - Specific to System Settings/Parameters](#)

You can use system-related system variables to include parameters in your automation task that are related to a particular computer.

Related reference

[Watching Variables](#)

## Date and Time System Variables

You can use the set of Date and Time system variables to insert or monitor the current date and time of a system as your automation task runs.

System Variables				?
Caption	Name	Return Value	Description	
Date/Time			(This category contains Date/Time variables.)	
Year	Year	Integer	Returns Year. e.g. if date is 02/23/04, it returns 2004.	
Month	Month	Integer	Returns System Month. e.g. if date is 02/23/04, it returns 2.	
Day	Day	Integer	Returns System Day. e.g. if date is 02/23/04, it returns 23.	
Date	Date	Date	Returns System Date in mm/dd/yyyy HH:mm:ss format.	
Hour	Hour	Integer	Returns System Hour. e.g. if time is 17:33:49, it returns 17.	
Minute	Minute	Integer	Returns System Minute. e.g. if time is 17:33:49, it returns 33.	
Second	Second	Integer	Returns System Second. e.g. if time is 17:33:49, it returns 49.	
Millisecond	Millisecond	Integer	Returns System Millisecond. e.g. if time is 17:33:49:10, it returns 10.	
Loop			(This category contains Loop related variables.)	
Excel			(This category contains Excel related variables.)	
Email			(This category contains Email related variables.)	
Trigger			(This category contains Trigger related variables.)	
PDF			(This category contains PDF related variables.)	
System			(This category contains System related variables.)	

OK

## Use Case Scenario

Using Date/Time variables can help you track and log points in time to monitor the success or error of a running process.

To view the system variables and their descriptions, follow these steps:

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
2. Click on the "Show System Variables" link.

To insert a Date/Time system variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command in the task pane.
2. Select the System Variables radio button.
3. In the drop-down menu, select the system variable that you want to insert.
4. Click Save.

Manage your Date/Time variables by using the options listed in the table. The table shows Date/Time system variable names, return values, and actions.

For the Date variable, you can use the System Variables window to change the format that is returned in the Date variable. Follow these steps:

1. In the Workbench, click on the Variable Manager icon at the top or on the tab on the right side.
2. Click on the "Show System Variables" link.
3. Select the Date variable from the Date/Time list of variables and click the ... button.
4. Select the date format in the Select Date Format pop-up window.

Caption	Name	Return Value	Description
Date/Time			(This category contains Date/Time variables.)
Year	Year	Integer	Returns Year. e.g. if date is 02/23/04, it returns 2004.
Month	Month	Integer	Returns System Month. e.g. if date is 02/23/04, it returns 2.
Day	Day	Integer	Returns System Day. e.g. if date is 02/23/04, it returns 23.
Date	Date	Date	Returns System Date in mm/dd/yyyy HH:mm:ss format.
Hour	Hour	Integer	
Minute	Minute	Integer	
Second	Second	Integer	
Millisecond	Millisecond	Integer	
Loop			
Excel			
Email			
Trigger			(This category contains Trigger variables.)
PDF			(This category contains PDF variables.)
System			(This category contains System variables.)

Examples:

- The following command stores the current DATE, DAY, and YEAR path in a log file. This is important while logging of errors or certain important information on files to include the date stamp.
  - Drag and drop the Log To File command.
  - Use the F2 function key to insert variables for \$Date\$, \$Day\$ and \$Year\$.

Command:

```
Log to File: Date:$Date$Day:$Day$Year:$Year$ in
"C:\Variable Operation.txt"
```

- The following command stores the current HOUR, MINUTE, and SECONDS in a log file. This adds the timestamp to the log for analysis.

a) Drag and drop the Log To File command.

b) Use the F2 function key to insert variables for \$Hour\$, \$Minute\$, and \$Seconds\$.

Command:

```
Log to File:
Hour:$Hour$Minute:$Minute$Seconds:$Second$ in "C:\Variable
Operation.txt"
```

# System Variables - Loop

A Loop system variable complements the Loop command and works within the scope of a defined loop. Most loop variables have no value when used outside of loops.

You can manage your Loop command using the variable options in the following table.

System Variables			
Caption	Name	Return Value	Description
Date/Time			(This category contains Date/Time variables.)
Loop			(This category contains Loop related variables.)
Counter	Counter	Integer	Use in Loop. Returns current count value.
FileName	File Name	String	Use in Loop for each file in a folder command. Returns file name.
FolderName	Folder Name	String	Use in Loop for each folder in a folder command. Returns folder name.
CurrentDir	Current Directory	String	Use in Loop for each File/Folder in a Folder command. Returns path of folder.
Extension	Extension	String	Use in Loop for each file in a folder command. Returns file extension.
Dataset Column	Dataset Column	Record	Use in Loop for each record in dataset. Returns single record of datasource.
Table Column	Table Column	Row	Use in Loop for each row in a Table. Returns single row of Table.
Excel Column	Excel Column	Row	Use in Loop for each row in Excel. Returns single row of excel.
Error Line Number	Error Line Number	Integer	Returns Automation Anywhere task error line number.
Error Description	Error Description	String	Returns Automation Anywhere task error line description.
Filedata Column	Filedata Column	String	Use in Loop for each record in CSV/Text file. Returns single node of File.
XML Data Node	XML Data Node	String	Use in Loop for each node in XML file. Returns single node of File.
Excel			(This category contains Excel related variables.)
Email			(This category contains Email related variables.)

## Example 1:

Start Loop "Each File In Folder D:\My Desktop\JAVA"

Comment: Please enter your commands to loop. Use \$filename\$.extension\$ variable for each file name in the Loop.

End Loop

Start Loop "Each row in an Internet Explorer Table of Session: Default"

Comment: Please enter your commands to loop. Use \$TableColumn\$ variable for each row in Table.

End Loop

## Example 2:

1. Comment: ----- Start XML Session-----

```

2. XML : Start XML Session using
existing file "D:\My Desktop\XML Files\Bookstore -
1.xml"Session:Session1

```

3. Comment: -----Get Multiple Nodes, I have set Xpath Xpression as Book [1], means only First Occurance -----
4. XML : Get Multiple Nodes text value from XPath expression "//book[1]/author". Session:Session1
5. Comment: ----- Use Loop for "Each Node in XML Dataset" -----
6. Start Loop "Each Node In a XML Dataset Session: Session1"
7. Comment: ----- Pring Node Value to Message box using SYSTEM Variable "XML Data Node (Node Name)" -----
8. Message Box: "\$XML Data Node(author)\$"
9. End Loop
10. Comment: ----- Get Multiple Nodes, I have set Xpath Xpression as "Lang", means only All Occurance -----
11. XML : Get Multiple Nodes attributes name "lang" from XPath expression "//book/title ". Session:Session1
12. Comment: ----- Use Loop for "Each Node in XML Dataset" -----
13. Start Loop "Each Node In a XML Dataset Session: Session1"
14. Comment: -----Pring Node Value to Message box using SYSTEM Variable "XML Data Node (Node Name)" -----
15. Message Box: "\$XML Data Node(lang)\$"
16. End Loop

Related concepts

[System Variables](#)

[User defined variables](#)

Related reference

[Loop command](#)

## Email System Variables

You can use Email system variables within an Email automation task to manage your email automation loop. These variables are specific to the scope of the loop that processes each email message for the server.

System Variables			
Caption	Name	Return Value	Description
Date/Time			(This category contains Date/Time variables.)
Loop			(This category contains Loop related variables.)
Excel			(This category contains Excel related variables.)
Email			(This category contains Email related variables.)
Email From	Email From	String	Use in Loop for each email in server. Returns email From address.
Email To	Email To	String	Use in Loop for each email in server. Returns email To address.
Email Cc	Email Cc	String	Use in Loop for each email in server. Returns email Cc address.
Email Subject	Email Subject	String	Use in Loop for each email in server. Returns email Subject.
Email Message	Email Message	String	Use in Loop for each email in server. Returns email Content.
Email Received Date	Email Received Date	String	Use in Loop for each email in server. Returns email Received Date.
Email Received Time	Email Received Time	String	Use in Loop for each email in server. Returns email Received Time.
Trigger			(This category contains Trigger related variables.)
PDF			(This category contains PDF related variables.)
System			(This category contains System related variables.)

OK

Manage your email automation using the e-mail variable options in the table below.

Note: Applicable only for the [Loop command](#): Each Email Message on Mail Server.

When you use the Loop/Email automation command (see example below), a comment in the task explains how you can use these system-defined variables.

Example 1:

1. Start Loop "Each message on server: mail.automationanywhere.com,User Name: https://support.automationanywhere.com, ServerType: IMAP, Message Format: HTML"
2. Comment: Please enter your commands to loop. Use Email Automation variables for each email on Server (e.g. \$Email From\$, \$Email To\$, etc.)
3. End Loop

Example 2:

In below example we extract emails from inbox and store them in text files. This type of task can be scheduled and emails can be retrieved offline.

1. Start Loop "5" Times
2. Comment: Please enter your commands to loop.
3. Start Loop "Each message on server: imap.gmail.com, User Name: admin1, SSL, ServerType: IMAP, Message Format: HTML"
4. Comment: Please enter your commands to loop. use sys variables for each email on Server.(e.g. \$Email From\$, \$Email To\$, etc.)
5. Log to File: \$Email From\$ John in "D:\\Desktop\\1.txt"
6. Message Box: "\$Email Subject\$ \$Email From\$"
7. Variable Operation: Reset: \$Email From\$
8. Message Box: "\$Email Subject\$"
9. Variable Operation: Reset: \$Email Subject\$

- 
10. End Loop
  11. End Loop

The variables in this example can be reset using the Variable Operation (System Variable) command. The drop-down menu offers all of the options for resetting.

Related concepts

[System Variables](#)

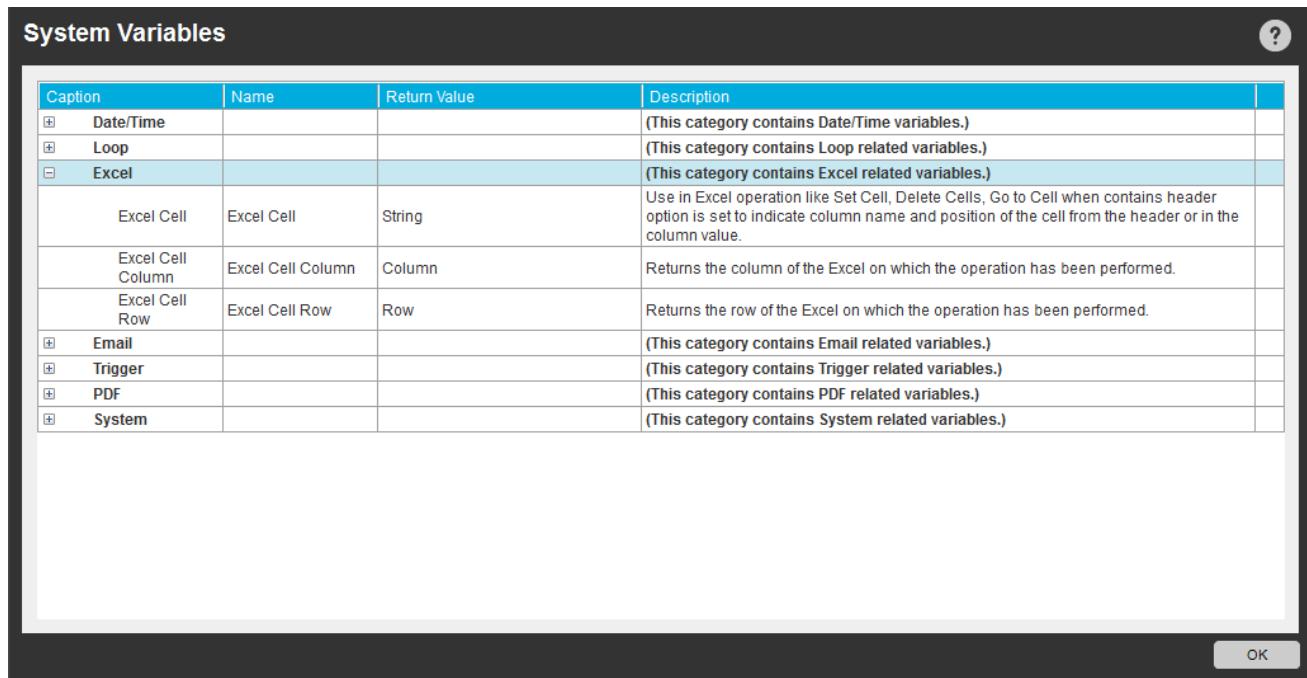
[User defined variables](#)

Related reference

[Email Automation command](#)

## Excel System Variables

You can use Excel System Variables to manage Excel automation processes. These variables are specific to the scope of the Excel command.



The screenshot shows a 'System Variables' dialog box with a table of categories and their descriptions. The table has four columns: Caption, Name, Return Value, and Description. The 'Caption' column contains category names like Date/Time, Loop, Excel, Email, Trigger, PDF, and System. The 'Name' column is mostly empty or contains the category name. The 'Return Value' column specifies the type (String, Column, Row). The 'Description' column provides details about each category.

Caption	Name	Return Value	Description
Date/Time			(This category contains Date/Time variables.)
Loop			(This category contains Loop related variables.)
Excel			(This category contains Excel related variables.)
Excel Cell	Excel Cell	String	Use in Excel operation like Set Cell, Delete Cells, Go to Cell when contains header option is set to indicate column name and position of the cell from the header or in the column value.
Excel Cell Column	Excel Cell Column	Column	Returns the column of the Excel on which the operation has been performed.
Excel Cell Row	Excel Cell Row	Row	Returns the row of the Excel on which the operation has been performed.
Email			(This category contains Email related variables.)
Trigger			(This category contains Trigger related variables.)
PDF			(This category contains PDF related variables.)
System			(This category contains System related variables.)

## Excel relevant system variables

1. Excel Cell - This will indicate the column name and position of the cell from the header, when 'Contains Header' is enabled for a session in Open Spreadsheet of the Excel Command. It is applicable to Excel operations like Get Cells, Set Cells, Go to Cell, Delete Cells and Find/Replace.
2. Excel Cell Column - This will return the column of the Excel on which the operation has been performed.
3. Excel Cell Row - This will return the cell of the Excel on which the operation has been performed.

# Trigger Variables

You can use a trigger system variable anytime you work with an automation task that is launched with a trigger.

The trigger value is determined based on the type of trigger event.

System Variables			
Caption	Name	Return Value	Description
Date/Time			(This category contains Date/Time variables.)
Loop			(This category contains Loop related variables.)
Excel			(This category contains Excel related variables.)
Email			(This category contains Email related variables.)
Trigger			(This category contains Trigger related variables.)
Trigger Value	Trigger Value	String	Returns Name of File/Folder/Window for which a trigger is fired.
PDF			(This category contains PDF related variables.)
System			(This category contains System related variables.)

OK

Using trigger variables is particularly helpful when multiple trigger events are used with an automation task. The variable provides information about the name of the file, folder, window, or service name for the trigger event.

For other uses, this system variable does not contain a value.

The following table provides the return values and description for the trigger variable.

Name	Return Value	Description
Trigger Value	String	Returns the name of File/Folder/Window/Service for which a trigger is fired, depending on the trigger type that was executed.

Related concepts

[System Variables](#)

[User defined variables](#)

Related reference

[Using the Trigger Manager](#)

[Trigger Variables](#)

## PDF System Variables

You can use the PDF system variables with the PDF Integration command.

The following table provides the names, return values, and descriptions for the PDF system variables.

Name	Return Value	Description
PDFFFileName	String	Returns PDF file name for given file with .pdf extension.
PDFTitle	String	Returns PDF title for given file.
PDFAuthor	String	Returns PDF author name for given file.
PDFSubject	String	Returns PDF subject for given file.

Example:

PDF Integration:

Convert "D:\PDF\fw4.pdf" to images as "\$PDFTitle\$" under folder "D:\PDFImages\"

Related concepts

[System Variables](#)

[User defined variables](#)

Related reference

[PDF integration command](#)

## System Variables - Specific to System Settings/Parameters

You can use system-related system variables to include parameters in your automation task that are related to a particular computer.

The variables return actual system settings and parameters, such as RAM, CPU/RAM usage, and total RAM.

System Variables			
Caption	Name	Return Value	Description
System			(This category contains System related variables.)
Machine	Machine	String	Returns Machine Name.
Clipboard	Clipboard	String	Returns Clipboard text data.
System	System (Name)	String	Name = { "Path", "PATHEXT", "USERDOMAIN", "PROCESSOR_ARCHITECTURE", "ProgramW6432", "PUBLIC", "APPDATA", "windir", "LOCALAPPDATA", "CommonProgramW6432", "USERDNSDOMAIN", "OneDrive", "USERPROFILE", "ProgramFiles", "PROCESSOR_LEVEL", "FP_NO_HOST_CHECK", "HOMEPATH", "COMPUTERNAME", "VISUALSVN_SERVER", "PROCESSOR_ARCHITEW6432", "USERNAME", "NUMBER_OF_PROCESSORS", "PROCESSOR_IDENTIFIER", "TMP", "SystemRoot", "ComSpec", "LOGONSERVER", "TEMP", "ProgramFiles(x86)", "CommonProgramFiles", "JAVA_HOME", "USERDOMAIN_ROAMINGPROFILE", "PROCESSOR_REVISION", "CommonProgramFiles(x86)", "ALLUSERSPROFILE", "SystemDrive", "PSModulePath", "OS", "ProgramData", "HOMEDRIVE" }
AAApplicationPath	Application Path	String	Returns Product Application Path.
AAInstallationPath	Installation Path	String	Returns Product Installation Path.
AATaskName	Task Name	String	Returns complete path and name of the task being executed.
AAControlRoom	Control Room URL	String	Returns URL of the connected Control Room.
CPUUsage	CPU Usage	Percentage	Returns percentage CPU usage.
RAMUsage	RAM Usage	Integer	Returns RAM usage in MB.
TotalRAM	Total RAM	Integer	Returns total amount of RAM in MB.

OK

## Common Use Case

These variables are useful when the performance of a system needs to be tracked during an activity; for instance load testing.

The following matrix provides description and the system variable's possible uses:

Variable	Description	Example
Machine	Returns machine name	You can use it in the Log to File command to log the name of the machine on which the Bot was executed.
Clipboard	Returns clipboard text data	You can use it in Clipboard to copy or in Message command to display the text that is copied to the clipboard.
System	Returns name of the system	You can use it in Log to File command to log the name of the system on which the Bot was executed.
AAApplicationPath	Returns the application path of the product	You can use it in Run Task command to select the task from an application path.
AAInstallationPath	Returns the installation path of the product	You can use it in Message command to display or in Log to File command to log the installation path of AAE Client.
AATaskName	Returns the name of the task being played along with its path	You can use it in Comment/Message command to display the name of the task with its application path.

Variable	Description	Example
AATaskExecutor	Returns the name of the user who executed the task from the Client or Enterprise Control Room	You can use it in a notification to know who executed the automation and from where did it originate.
AAControlroom	Returns the URL of the Enterprise Control Room the Bot is connected to	You can use it in Email Automation command to send the URL of the Enterprise Control Room the Bot Runner is connected to.
CPUUsage	Returns the CPU usage stats in percentage	You can use it in Log to File command to log data of CPU usage for a particular operation within the Bot (Task) while it was executed.
RAMUsage	Returns the RAM usage stats in MB	You can use it in Log to File command to log data of RAM usage for a particular operation within the Bot (Task) while it was executed.
TotalRAM	Returns the total amount of RAM in MB	You can use it in Log to File command to log data of Total RAM available in the system.
OSName	Returns the name of the Operating System	You can use it in Log to File command to log the name of the Operating System (OS) used in the system on which a Bot (Task) was executed.
ArrayRows	Returns the number of rows for selected Array Variable	You can use it in If command with variable conditions based on the number of rows in the Array Variable.
ArrayColumns	Returns the number of columns for selected Array Variable	You can use it in If command with variable conditions based on the number of columns in the Array Variable.
WorkItem	Returns the data in read only form for individual attributes of a selected queue	You can use it only in the Insert Work Item command when you want to read attributes of the selected queue.

Note: When you select the System variable, a menu is displayed from which you can select the specific system variable (see steps below).

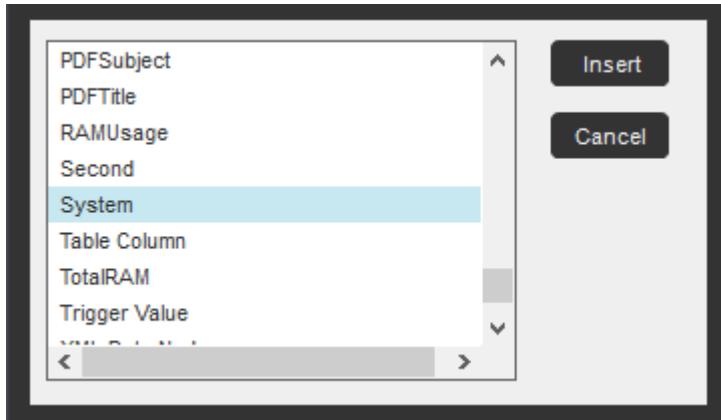
### Steps to select System Related Variables:

1. Click F2 and you will see Insert Variable window.
2. Select the required variable and click Insert.

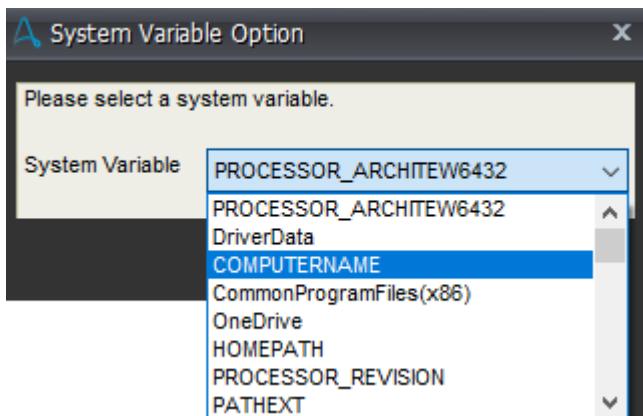
Note: Don't confuse System Related Variables with System Variables. To select System from System Related Variables, refer the following section.

### Steps to select System from System Related Variables

1. Click F2 and you will see Insert Variable window.



2. Select System and click Insert, a pop up window for System Variable Option is displayed.



Note: 11.3.2.1 The COMPUTERNAME system variable returns first 15 characters of the computer name in uppercase.

3. Click OK and insert the system variable.

## Troubleshooting an error

Error: If you use the \${CPUUsage\$} variable in a message box and an error message is issued, you need to reset the counter for the system by performing the following action:

Open a command prompt and enter the following two commands:

```
cd\windows\system32 [enter]
lodctr /R [enter]
```

## Examples

When creating an executable file (EXE) for a task, you might want to use the path of the EXE to log a file or refer to a file located in a folder. In this case, use the AAApplicationPath variable to select the path of the EXE from any location in which it is stored. This eliminates the need to use static paths for EXEs.

1. The following command stores the current application path in a log file. Drag and drop a Log To File command to your task, and press the F2 key to insert \$AAApplicationPath\$ variable:

```
Log to File: Automation Anywhere Application Path:$AAApplicationPath$ in "C:\Variable Operation.txt"
```

2. The following command stores the current RAM usage and CPU usage in a log file. Drag and drop a Log To File command to your task, and press the F2 key to insert \$RAMUsage\$ and \$CPUUsage\$ variables.

```
Log to File: CPU Usage:$CPUUsage$ RAM Usage:$RAMUsage$ in "C:\Variable Operation.txt"
```

3. The following command stores the current Task path in a log file. Drag and drop a Log To File command to your task, and press the F2 key to insert \$AATaskName\$ variable.

```
Log to File: Automation Anywhere Application Path:$AATaskName$ in "C:\Variable Operation.txt"
```

## Credential variables

Credential variables securely store sensitive information that will be used when running automation tasks.

Bot Creators retrieve credential variables from Credential Lockers when configuring certain commands. In order to access the credential variables, the Bot Creator must be connected to the Enterprise Control Room

The Enterprise Control Room administrator creates Credential Lockers in the Credential Manager. Each Credential Locker is made up of Credential Key and Attributes, which can be assigned in commands as credential variables.

## Using the Credential Variables

- Credential variables are accessed by pressing the function key F2.
- A Bot Creator can only insert the credential variables in commands; no add or update rights are available to the Bot Creator.  
Note: A Bot Creator cannot append another variable (Local/System variable) or a string to a credential variable.
- Credential variables contained in the Credential Lockers can be seen and accessed only from the Insert Variables window.
- Only the name of a Credential Key is visible in the command field and list of credential variables; attribute values are never displayed.
- **11.3.2** If the attribute option This is a password is selected while creating a credential in the Enterprise Control Room, then the attribute will be available for selection only in those fields that are of Password type in credential variables supported commands.

The password-type attribute is visible only for those of the commands listed in [Commands that support Credential Variables](#) that have a password field or those that capture fields that require password as input.

**Note:**

- If a secure credential attribute is used in a non-secure textbox / field of any command that does not support password-type attributes, an error will be shown when the bot runs.
- If a secure attribute is used in a non-secure textbox / field you must detect such a deviation during the review process to eliminate an error when the bot runs in a production environment.
- A bot user must update Flex, Chrome, and Edge plugins for using password-only attributes in commands that access UI objects in specific applications.
- Bulk Edit is allowed only on commands that use the same credential variables.
- To delete a credential variable, double click or hit 'Backspace' and then 'Delete'.
- Copy-pasting the variable converts it to string. Manually inputting the variable name also converts it to string.

Note: Users who have migrated from versions earlier than 10.3, note that when you insert a credential variable in existing tasks, the earlier parameters are deleted.

## Commands that support Credential Variables

The following commands support use of credential variables:

- [Active Directory command](#)
- [Citrix Automation](#)
- [Database command](#)
- [Email Automation command](#)
- [Excel command](#)
- [FTP / SFTP command](#)
- [Insert Keystrokes command](#)
- [Manage Window Controls command](#)
- [Object Cloning command](#)
- [PDF integration command](#)
- [PGP command](#)
- [REST Web Service command](#)
- [SAP Integration Command](#)
- [SOAP Web Service command](#)
- [Terminal Emulator command](#)
- [Web Recorder command](#)

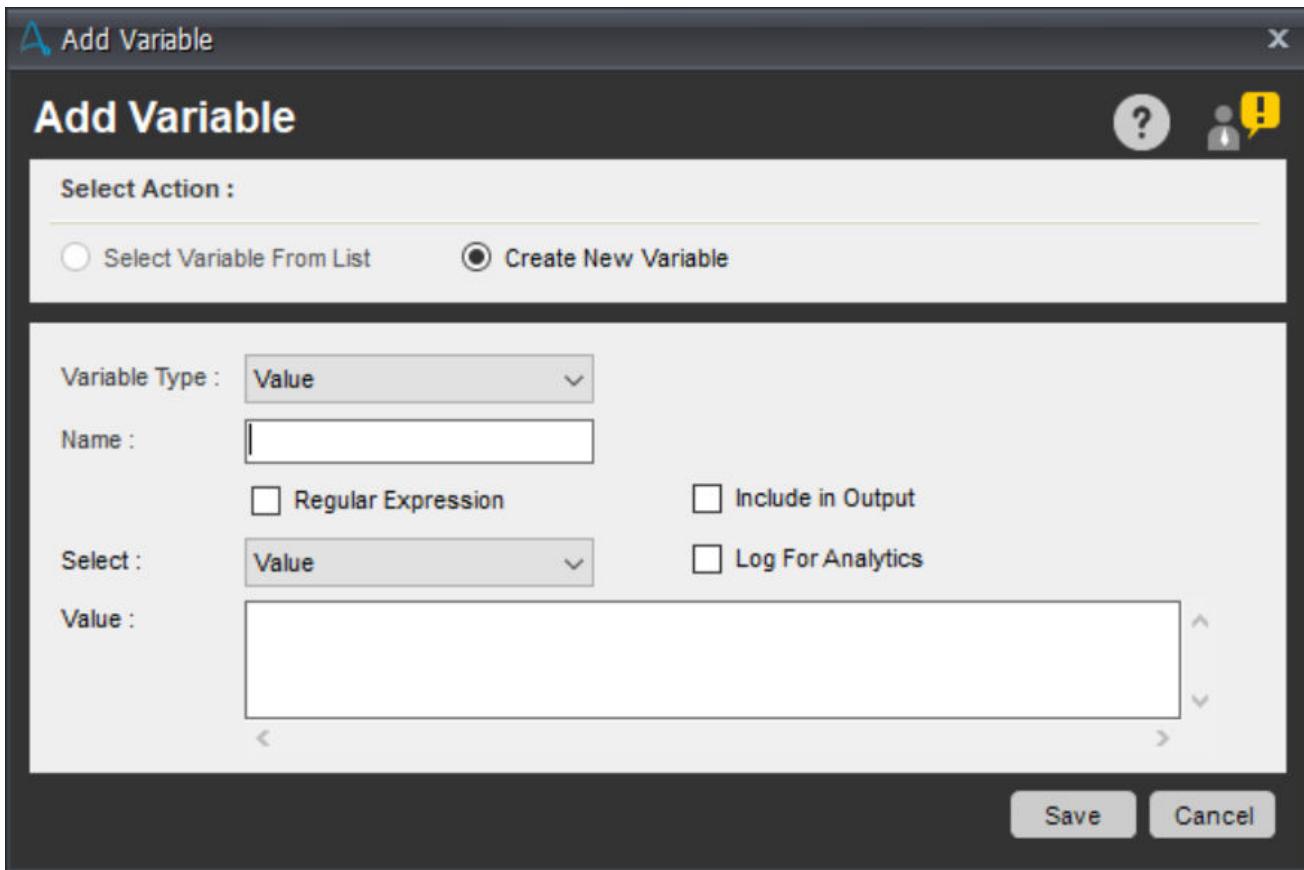
Note: 11.3.2

- The password-type attribute is visible only for those of the above commands that have a password field or those that capture fields that require password as input.
- For Object Cloning command, password-type attributes are applicable in Play Mode only.
- For MetaBot Screen, only Standard screen supports password-type attributes.
- In MetaBot, only normal objects support password-type attributes.
- Password-type attributes are not supported in Manage Windows Controls command.

## Working with Variables

These topics describe how you can create and modify variables, as well as take other actions on variables with your automation tasks.

When you create new value type variables, the Log for Analytics option is selected by default.



You can clear this option if you do not want to log data for the particular variable for analysis.

- [Reinitializing Variables](#)

When you create user variables and use them within automation tasks, you need to reinitialize them each time you use them.

- [Resetting System Variables](#)

When using some system variables, you have the option to reset the values while a task is running.

- [Assigning Variables in a Task](#)

After you define variables, you can perform operations on them within your automation tasks. Variable Operation command enables you to assign and reinitialize user variables.

- [Reading Variables from an External File](#)

If you don't want to specify the value of the variable at the time you create the variable, Automation Anywhere allows you to set the values of variables using an external file such as CSV, Excel, text, and database.

- [Watching Variables](#)

This topic describes how to use the Automation Anywhere Variable Watch feature to watch your variables, when the automated task is running.

- [Using Variables to Create Timestamps for Your Files](#)

Timestamps are useful tools to use in your automation tasks to track when particular events occur.

- [Passing a Variable to a VB Script](#)

In conjunction with Automation Anywhere, running VB scripts can be very powerful.

- [Using Variables with IF-Else and LOOP Commands](#)

The IF/Else and LOOP commands enable you to use variables, allowing you to run a loop until a particular condition is met for the variable.

- [Passing a Variable between Running Tasks](#)

You can pass an individual variable value from one task to another by using this option.

- [Using Array Variable in Loop Command](#)

After Array Type variables are created, you can process them in automated tasks using Loop command.

- [Using Array Type Variables](#)

An array variable is a two-dimensional variable that holds multiple values in a table of rows and columns. Arrays are very powerful for creating staging areas for data that need to be retrieved by your process as it runs.

- [Create new variables](#)

Create new variables for an automation from the Variable Manager.

- [Variable usage considerations](#)

To use variables in your TaskBots and MetaBots consider important facts.

## Reinitializing Variables

When you create user variables and use them within automation tasks, you need to reinitialize them each time you use them.

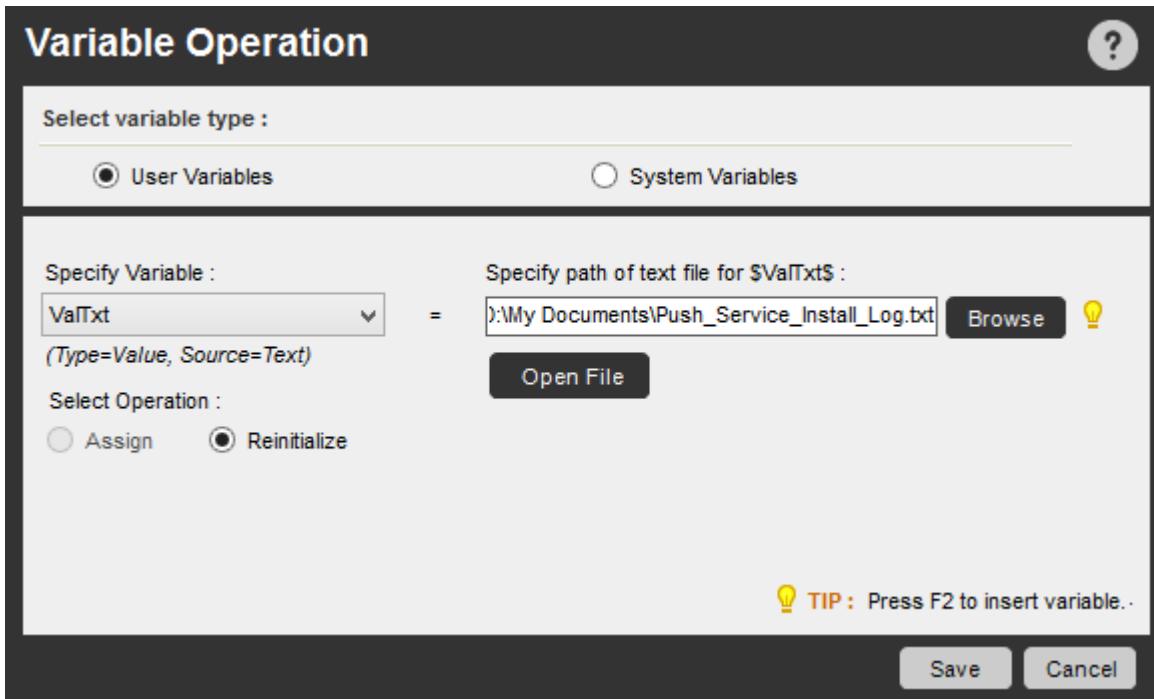
You can reinitialize any type of user variable, including:

- Value variables (Only read from txt type)
- List variables
- Array variables
- Random variables

## Reinitializing Value Variables

To reinitialize a value type variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the variable that you want to reinitialize.
4. Select the Reinitialize radio button.
5. In the "Specify value" field, browse to select a new text file for the variable to reinitialize the value.
6. Click Save. Any previous values for this variable will be overwritten.

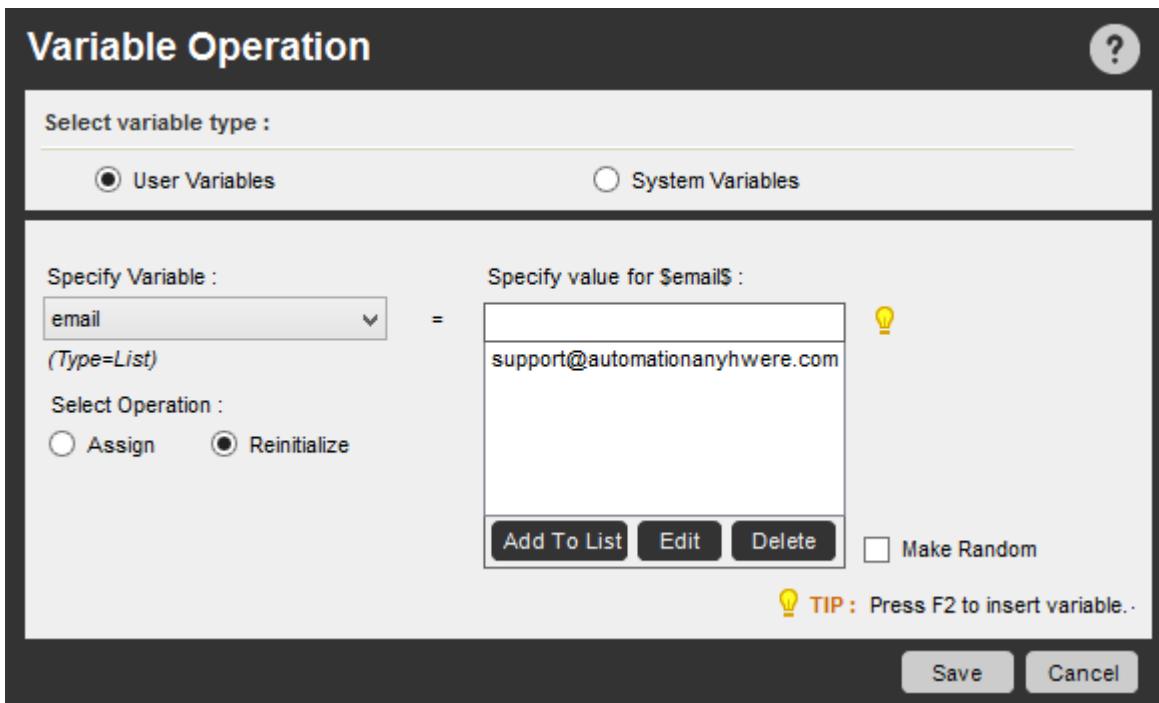


## Reinitializing List Variables

To reinitialize a list type variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the variable that you want to reinitialize.
4. Select the Reinitialize radio button.
5. In the "Specify value" field, type in new values or browse to locate a new text file.
6. Click Save.

Only the new values that are specified will be assigned. Any previous values for this variable will be overwritten.



## Reinitializing Array Variables

Several options are available for reinitializing array variables.

To reinitialize an array type variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the array variable from the list of user variables that are defined for the task. The variable type and source is displayed.
4. Select the Reinitialize radio button.
5. Specify new dimensions. For example, Row 2 and Column 2. You can also specify other variables to be inserted here by pressing the F2 function key and selecting the variable.
6. In the "Specify value" field, enter values or insert another variable by pressing the F2 function key.
7. Click Save.

## Variable Operation

Select variable type :

User Variables       System Variables

Specify Variable : Employee (Type=Array)

Specify new dimensions for \$Employee\$ :

= 10 X 5  
Row(s)      Column(s)

Select Operation :

Assign       Reinitialize

Initialize Values

💡 TIP : Press F2 to insert variable..

Save      Cancel

### Restrictions and Usage Rules:

- If the rows and columns are numeric, you can use the Initialize Values button to insert new values. In this case, both the structure and values for the array are completely redefined.
- For an array having source type Excel, you can reinitialize the entire row, column, range, or all of the cells.
- For an array having source type of Excel or CSV file, you need to specify a path in order to reinitialize it.

## Variable Operation

Select variable type :

User Variables       System Variables

Specify Variable : Employee\_HR = Specify path of excel / csv for \$Employee\_HRS : D:\My Documents\Master Output File.csv

(Type=Array, Source=Excel)

Select Operation :

Assign       Reinitialize

Get All       Range

Entire Row       Entire Column

From : A10 e.g. A1 To : A20 e.g. A5

TIP : Press F2 to insert variable..

- The Open File option is enabled only when you specify a valid file path.
- For an array having a Database source type, you can specify connection properties to a new database with its SQL query.

## Variable Operation

Select variable type :

User Variables       System Variables

Specify Variable : arrdb = Specify database for \$arrdb\$ : Provider=MSDASQL.1;Persist Security Info=False

(Type=Array, Source=Database)

Connection String

Select Operation :

Assign       Reinitialize

Employee\_Name, Employee\_ID from Employee

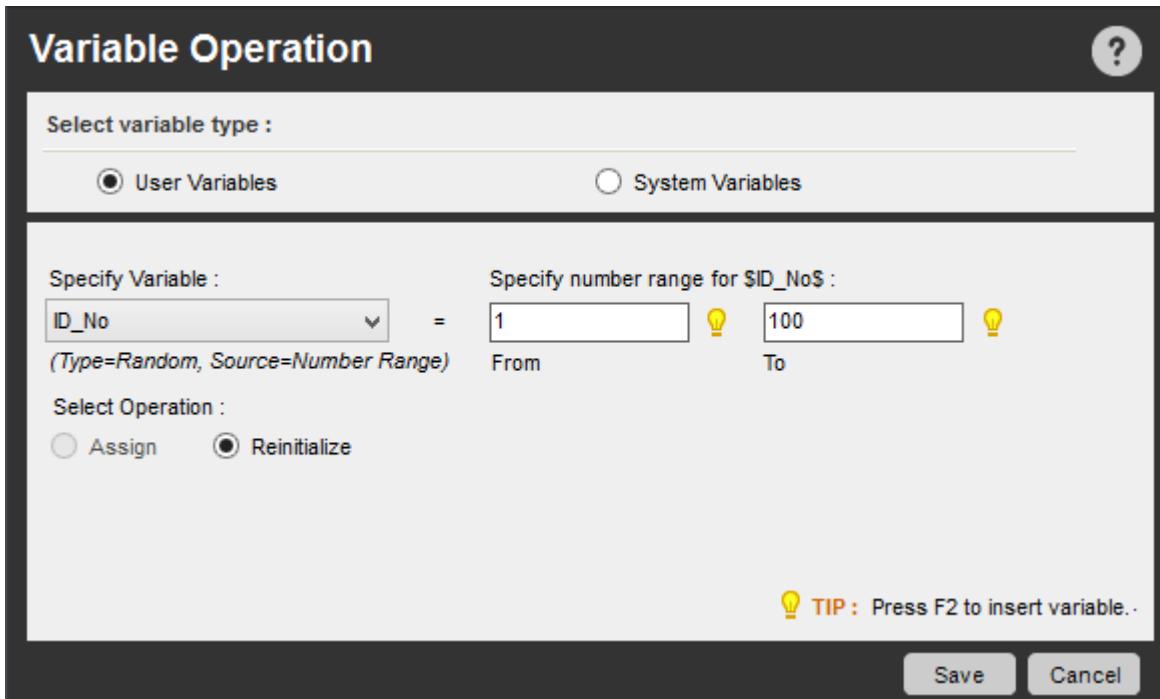
Enter Select Query

TIP : Press F2 to insert variable..

## Reinitializing Random Variables

To reinitialize a random variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the variable that you want to reinitialize.
4. Select the Reinitialize radio button.
5. In the "Specify value" field, specify new values for the number range or string.
6. Click Save. Any previous values for this variable will be overwritten.



## Use Case Scenarios

### Example 1:

Type: List Source: Read from text Reinitialize

1. Comment: Reinitialize Variable Type: List, Source: Read from text file having this RDlsttxt =<https://support.automationanywhere.com>, testing@gmail.com, sales@automationanywhere.com, buynow@automationanywhere.com
2. Variable Operation: Reinitialize  
\$RDlsttxt\$

3. Start Loop "List Variable  
\$RDlsttxt\$"
4. Comment: This Loop will run 4 times as 'List read from text file variable has 4 entries.
5. Comment: The following command will send emails to the address IDs listed in the above Read from text file -List variable.
6. Send Email: Subject "Automation  
Anywhere finished executing the task." with  
Attachment(s).
7. Message Box: "Email to  
'\$RDlsttxt\$' has been sent sucessfully."
8. End Loop

## Example 2:

Type: Array Source: Read from Excel

1. Comment: Reinitializing the Array Source: read from excel file (ArrayExl) with the CSV file extracted from the website.
2. Variable Operation: Reinitialize  
\$ArrayExl\$
3. Variable Operation:  
\$ArrayRows (\$ArrayExl\$) \$ To \$Row\$
4. Start Loop "\$Row\$"  
Times
5. If \$Counter\$ Equal To (=) "1"  
Then
6. Comment: To skip the header title of the csv extracted from the website
7. Continue
8. End If

```
9. Execute SQL Statement: 'Insert  
into Ebayphilosophy (BookTitle,cost) values  
("$ArrayExl($Counter$,1)$", '$ArrayExl($Counter$,2)$')' Session:  
'Default'
```

10. End Loop

## Resetting System Variables

When using some system variables, you have the option to reset the values while a task is running.

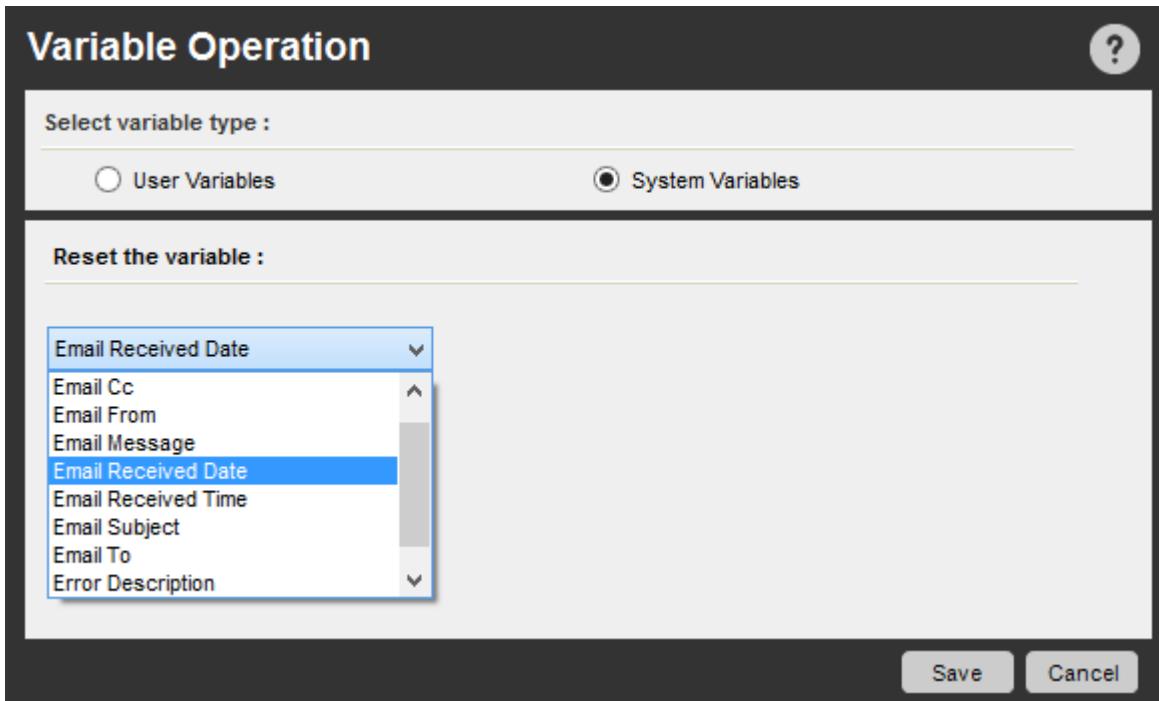
The following system variables can be reset:

- Error Description
- Error Line Number
- Email From
- Email To
- Email Cc
- Email Subject
- Email Message

To reset a system variable, follow these steps:

1. In the Task Editor, drag and drop a Variable Operation command into the task.
2. Select the System Variables radio button.
3. Select the system variable you want to reset.
4. Click Save.

When the task runs, the value for the system variable will be reset.



[Related tasks](#)

[Create new variables](#)

[Related reference](#)

[Using the Variable Manager](#)

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

[Watching Variables](#)

[Related information](#)

[Assigning Variables in a Task](#)

## Assigning Variables in a Task

After you define variables, you can perform operations on them within your automation tasks. Variable Operation command enables you to assign and reinitialize user variables.

Assignment means that a single value is attached to a variable. This operation enables the user to reuse the defined variables as the task runs.

Assignment can be performed on three types of variables: Value, List, and Array. For lists and arrays, the assignment is applied by specific positions within the list or array.

The following table shows the types and source (subtypes) of the user variables and if it supports the assignment operations on them.

## Assigning Value Variables

To assign a value to a Value type variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.

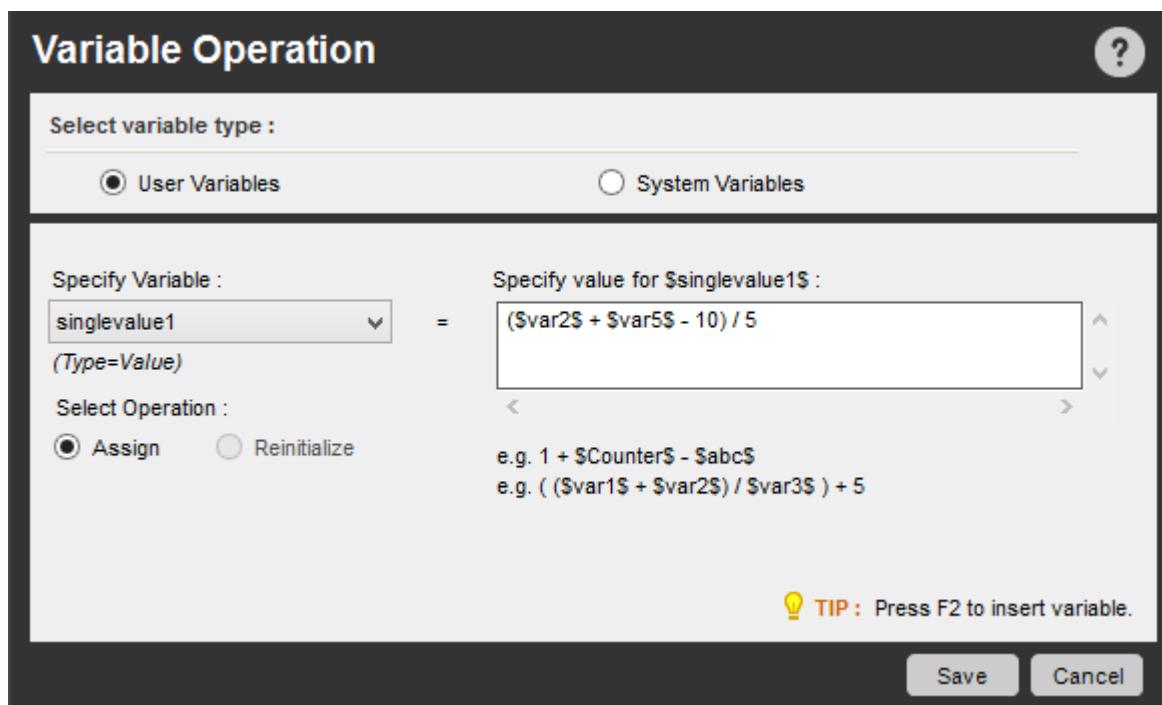
2. Select the User Variables option.
3. Under "Specify Variable," select the variable from the list of all user variables that are defined for the task. The variable type and source is displayed.
4. Select the Assign operation radio button.
5. In the "Specify value" field, enter a value or insert another variable by pressing the F2 function key.

The right side of the assignment can include any regular operation.

Example: `singlevalue1 = ($var2$ + $var5$ - 10) / 5`

Operators supported: (, ), /, \*, +, -

Order of Operations: Parentheses take first precedence in order, with the operation inside them being evaluated from left to right.



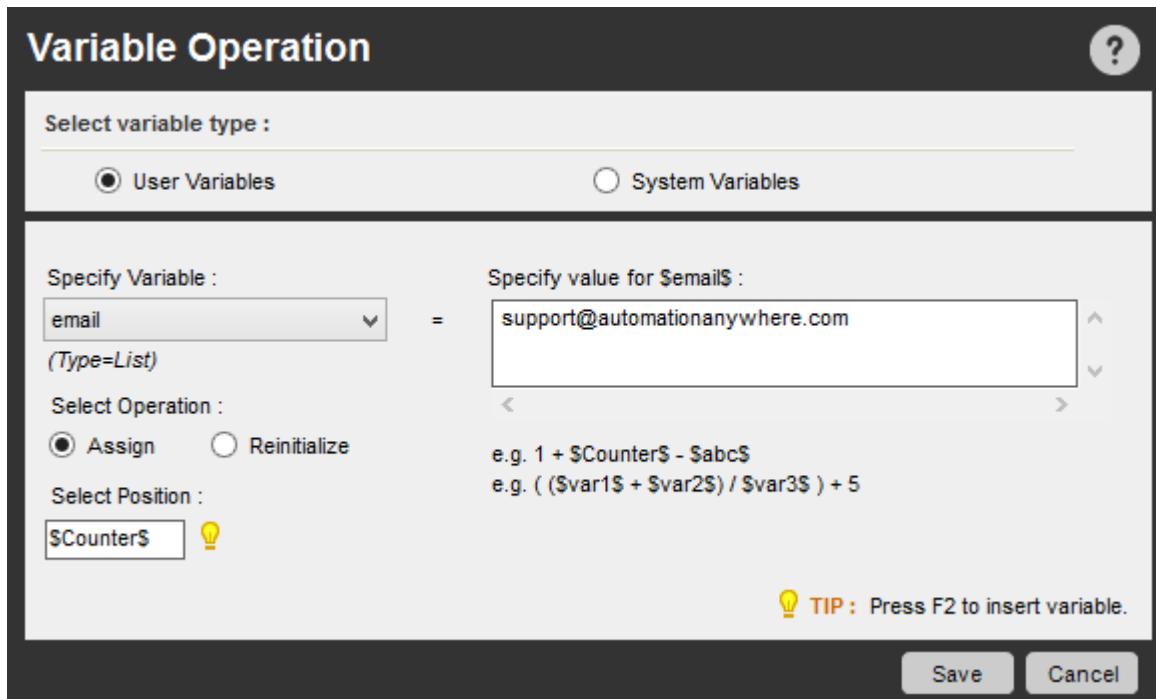
## Assigning List Variables

When assigning values to a List type variable, you need to specify the position for that value. Any previous value for that position will be overwritten.

To assign a value to a List type variable, follow these steps:

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the variable from the list of all user variables that are defined for the task. The variable type and source is displayed.
4. Select the Assign operation radio button.
5. For the list variable, the "Select Position" is displayed. Specify the position for this value. For example, `$Counter$`

6. You can also specify another variable to be inserted here by pressing the F2 function key and selecting the variable.
7. In the "Specify value" field, enter a value or insert another variable by pressing the F2 function key.



## Assigning Array Variables

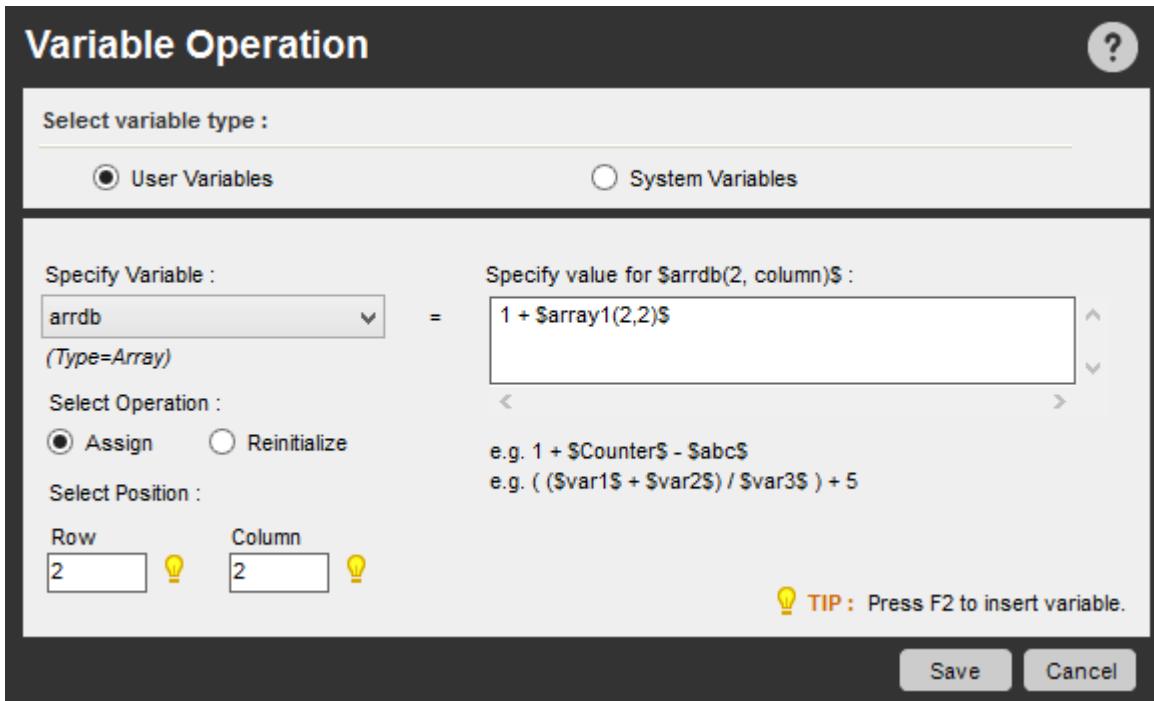
When assigning values to an Array type variable, you need to specify the positions for the values. Any previous values for these positions will be overwritten.

The source of the array variable can be Excel or CSV files, a database, or a text file, depending on the type of variable you select from the list.

To assign values to an Array type variable, follow these steps:

In the below example we are assigning an array variable for position (2,2) from another variable defined in the task.

1. In the Workbench, drag and drop a Variable Operation command into the task.
2. Select the User Variables option.
3. Under "Specify Variable," select the variable from the list of all user variables that are defined for the task. The variable type and source is displayed.
4. Select the Assign operation radio button.
5. For the array variable, the "Select Position" fields for Row and Column are displayed. Specify the position for these values. For example, "Row 2 and Column 2".
6. You can also specify other variables to be inserted here by pressing the F2 function key and selecting the variable.
7. In the "Specify value" field, enter values or insert another variable by pressing the F2 function key.



## Variable Operation: Rounding Values

When using the Variable Operation command in the Workbench, be aware that values are rounded.

For example, we use a Variable Operation command to assign the value '01.20' to a variable named Temp. The returning value in the message box will be 1.2, as the extra zeros before and after the value are removed.

Examples:

Example 1

Type: List, Source: Read from text example.

1. Comment: This Loop will execute for 5 times as List read from text file variable has 5 entries.
2. Comment: Create Variable List Type : Source = Read from text file having this RDlsttxt = 11, 21,31,41,51

```
Start Loop "List Variable
$RDlsttxt$"
```

3. Comment: Message box will show the addition of list variable value with other variable value. Here \$row \$=10

```
Variable Operation: $RDlsttxt$ + $row$ To
$Prompt-Assignment$
```

```
Message Box: "$Prompt-Assignment$"
End Loop
```

## Example 2

Type: Array Source: Read from Excel

- Comment: We use an array variable to read from existing excel file

```
Connect to "$ConnectStr$"
Session:'Default'
```

- Comment: ArrayRows is a system defined variable used to retrieve total rows in the user defined array.
- Comment: ArrayExl - is a user-defined array variable, using a source that is Read from Excel file. In this example, we use a list of books and games having title and cost, which is initialized in the Variable Manager.

```
Variable Operation: $ArrayRows($ArrayExl$) $ To
$Row$
Start Loop "$Row$" Times
```

- Comment: To skip the header title of the csv extracted from the website use below If condition

```
If $Counter$ Equal To (=) "1" Then
Continue
End If
```

```
Execute SQL Statement: 'Insert into Ebaykids
(BookTitle,cost) values
("$ArrayExl($Counter$,1)$",'$ArrayExl($Counter$,2)$')' Session:
'Default'
End Loop
Open "http://www.ebay.com/"
```

- Comment: Extracting the books on the philosophy into a CSV file using Web Recorder

```
Set text 'philosophy books' into _nkw in the
webpage 'Electronics, Cars, Fashion, Collectibles, Coupons and More
Online Shopping | eBay'
```

```
Click on 'Search' Command Button in the
webpage 'Electronics, Cars, Fashion, Collectibles, Coupons and More
Online Shopping | eBay'
```

```
Loop While Web Control Exists (Other HTML
Control : Next ) in the webpage 'philosophy books |
eBay'
```

```
Extract Multiple Data from Webpage to
$filePath$ from the web page: philosophy books | eBay
```

```
Click on 'Next' Other HTML Control in the
webpage 'philosophy books | eBay'
End Loop
```

```
Extract Multiple Data from Webpage to
$filePath$ from the web page: philosophy books | eBay
```

#### Related tasks

[Create new variables](#)

Related reference

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

[Watching Variables](#)

Related information

[Resetting System Variables](#)

## Reading Variables from an External File

If you don't want to specify the value of the variable at the time you create the variable, Automation Anywhere allows you to set the values of variables using an external file such as CSV, Excel, text, and database.

## Reading from a Text File

To read variable values from a text file, follow these steps:

1. In the Variable Manager, click the Add button at bottom or right-click on an existing variable and select Add to invoke the Add Variable window.

Note: In the Add Variable window, the Create New Variable option is selected by default.

2. Select the desired variable type, enter a name, and select the 'Read from Text File' option from the dropdown.

To ensure that Automation Anywhere reads text files properly when assigning values for the variables, follow these guidelines:

- One text file can have multiple <variable> = <value> pairs, on separate lines (line returns using the ENTER key).
- For value type variables, only one value should be assigned.
- Example: myvar=value1 where myvar is the name of the variable.
- Example: my-list-var= value1,value2,value3
- Ensure that your text file is specified in the Variable Manager before the task runs.
- For List type variables, you can define the comma-separated values for the variable.
- Variable names are not case-sensitive.

Example: Text file with different <variable>=<value> pairs:

Age=12,13,16,21

Games=Football,Soccer,Rugby

username=my-username

Removed the password field.

**Add Variable**

Select Action :

Select Variable From List  Create New Variable

Type : List

Name : Log\_New

Make Random

Select : Read from text file

Select File : D:\My Documents\AALog.txt

Open File [How to use?](#)

Save Cancel

## Reading from an Excel File

When you create an array variable and specify that values should be read from an Excel file, data can be read for the following:

- For an entire row
- For an entire column
- For a range of cells that you specify using the 'From' and 'To' fields

## Add Variable

Select Action :

Select Variable From List       Create New Variable

Type :

Name :

Select :

Select File :   [How to use?](#)

All Cells     Entire Row     Entire Column     Range

From :  e.g. A1    To :  e.g. A5

## Reading from a Database

To read values from a database file, you need to specify a connection string and a SELECT query.

**Add Variable**

Select Action :

Select Variable From List     Create New Variable

Type : **Array**

Name : **OracleEmpData**

Select : **Read from database**

Connection String : **Provider=MSDASQL.1** **Browse**

Enter Select Query : **Select Employee\_Name, Employee\_Email from em** [How to use?](#)

**Save** **Cancel**

Note: Reading variable from database is applicable only for array type variables.

Related reference

[Array Type Variables](#)

## Watching Variables

This topic describes how to use the Automation Anywhere Variable Watch feature to watch your variables, when the automated task is running.

To track the progress of variables within the task, Automation Anywhere provides a way for you to watch variables as they change.

This makes the progress of variables easier. This can be achieved using "Variable Watch Table" feature which is enabled when you are using the Debugging mode.

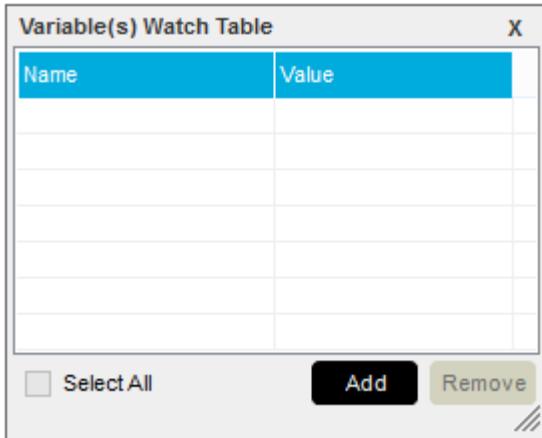
The Variable Watch Table displays current variable values while the task runs, and applies to all types of variables (user and system variables) that are defined for that task.

## Using the Variable Watch Table

To use the Variable Watch Table, click on the Enable Debugging button at the top of the Workbench. The Variable Watch Table pops up and displays the actual variable values (or what it contains) as the task runs a particular step.

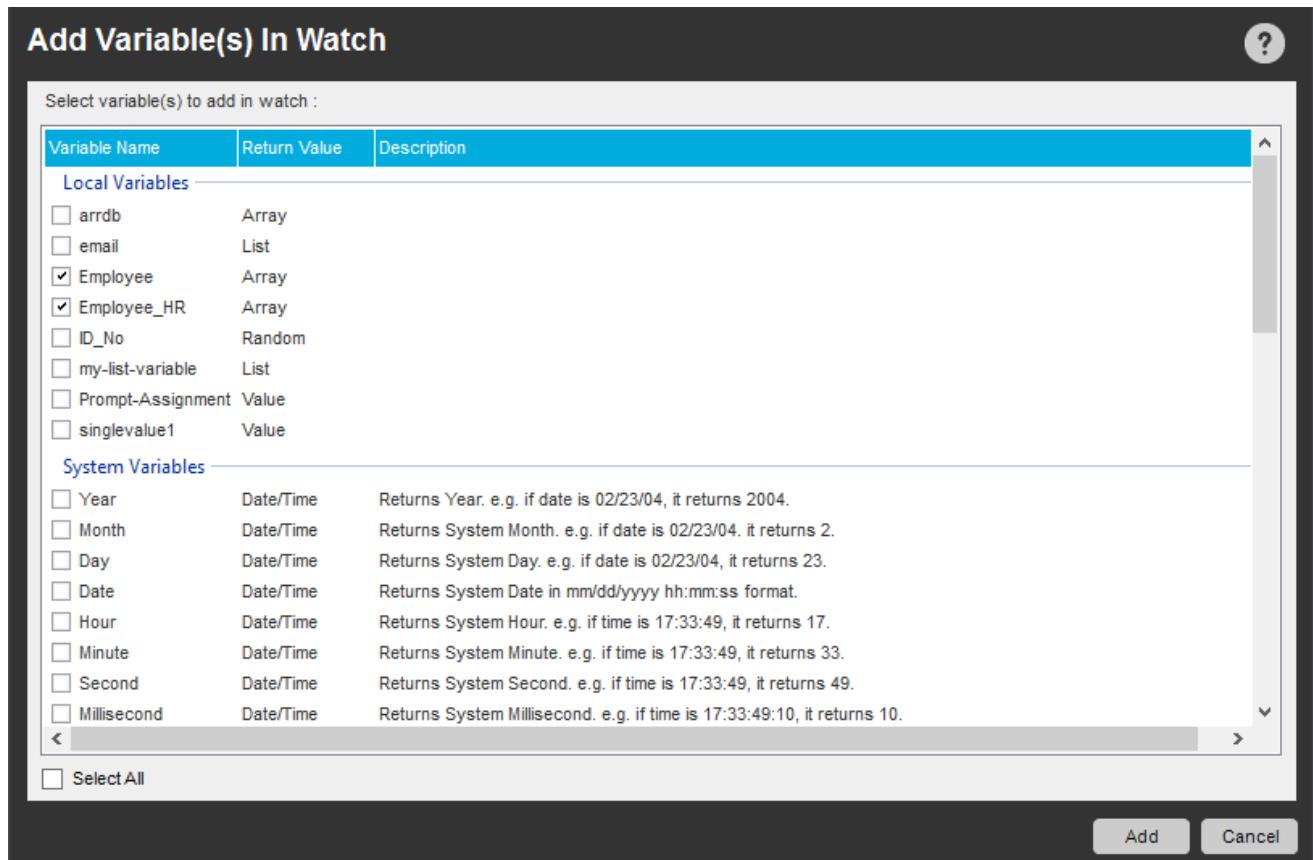


Initially, the Variable Watch Table is empty. Use the Add button to include variables you want to track.



When the "Add Variables in Watch" window is displayed, select the variables you want to watch and click the Add button.

Any user variables and system variables that are defined for the task can be added to the table.



As shown below, the Variable Watch Table contains all of the variables selected for watching. The values get populated and changed as the task runs.

Variable(s) Watch Table	
Name	Value
<input type="checkbox"/> Employee	
<input type="checkbox"/> Employee_HR	
<input type="checkbox"/> Select All	
	<b>Add</b>
	<b>Remove</b>

For an array variable, the Variable Watch Table shows the column/row value. For example, (1,1) is displayed in the left column (Name) in the table.

Variable(s) Watch Table	
Name	Value
<input type="checkbox"/> Second	9
<input type="checkbox"/> Table Column(1)	
<input type="checkbox"/> TotalRAM	3992
<input type="checkbox"/> Trigger Value	
<input type="checkbox"/> XML Data Node(1)	
<input type="checkbox"/> Year	2014
<input type="checkbox"/> Select All	
	<b>Add</b>
	<b>Remove</b>

Related reference

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

Related information

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## Using Variables to Create Timestamps for Your Files

Timestamps are useful tools to use in your automation tasks to track when particular events occur.

The following system variables are available for you to use to create timestamps for your files:

- Year
- Month
- Day
- Hour
- Minute
- Second

- Date

You can combine any of these variables to design your own timestamp formats.

To design date/time timestamps, following these steps:

1. Launch the Variable Manager.
2. Click on "Show System Variables".
3. Select the Date/Time variable and use a combination of variables.

## Using the Date Variable with File Names

If you use the Date variable to append a date to file names, you cannot use a slash (/) in your date format. Microsoft Windows prohibits the use of the slash character in file names.

Examples:

1. To create a timestamp for Year, Month, and Day, that is appended to the end of string 'ABC', type: ABC\$Year\$\$Month\$\$Day\$

This example might look like this: ABC2013521

2. To create a complete timestamp for the previous example with the current date and time, type: ABC\$Year\$\$Month\$\$Day\$\$Hour\$\$Minute\$\$Second\$

This example might look like this: ABC201352107:03:03

3. For clarity, you can insert text characters between the variables.

For example, to display ABC2013-5-21, type: ABC\$Year\$-\$Month\$-\$Day\$

Related tasks

[Create new variables](#)

Related reference

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

[Using the Variable Manager](#)

Related information

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## Passing a Variable to a VB Script

In conjunction with Automation Anywhere, running VB scripts can be very powerful.

Sometimes, people prefer to run VB (Visual Basic) scripts to accomplish a task or process. These scripts can be automated, using the Run Script command.

## Sample Use Cases:

- Obtain data from a file on a website
- Calculate dates and times

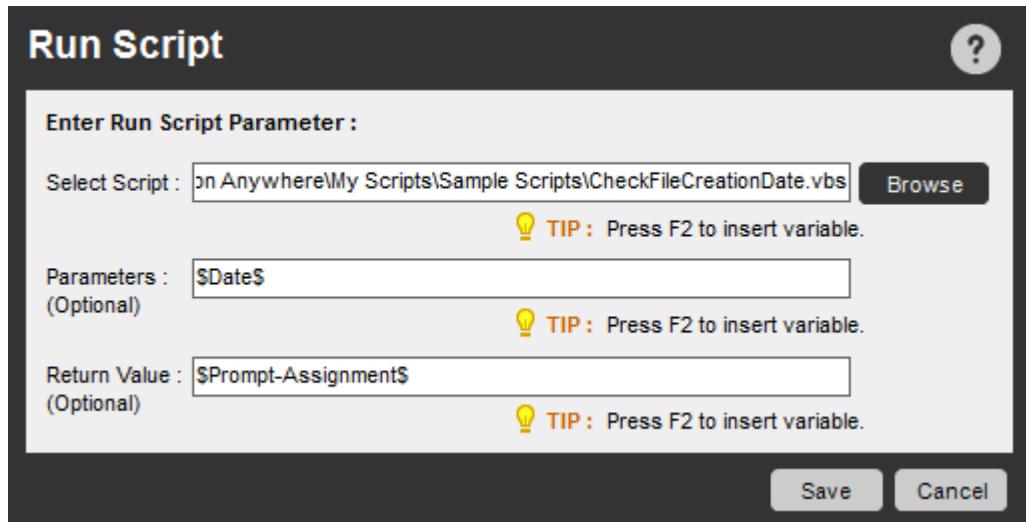
Use the Run Script command to pass values in a variable to the Parameter field. You can then obtain the output from the Return Value field.

Commands that are required to pass values to a VB script and obtain the results include:

1. Pass values in the VB script: WScript.Arguments.Item(0)
2. Return values in VB script: WScript.StdOut.WriteLine "Variable"

For "Variable", the double quotes are not required for Return values.

Separate the values with a space.



Related reference

[Types of Variables](#)

[Working with Variables](#)

## Using Variables with IF-Else and LOOP Commands

The IF/Else and LOOP commands enable you to use variables, allowing you to run a loop until a particular condition is met for the variable.

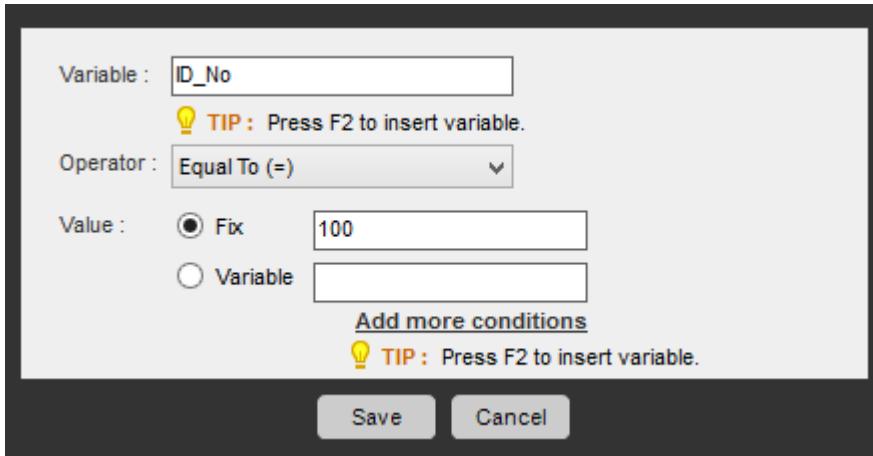
### Using IF/Else Commands with Variables

While inserting an If/Else condition, select a variable you want to use (see example).



### Using Loop Commands with Variables

While inserting a Loop condition, select a variable you want to use within the loop until the condition is met (see example).



Related reference

[Passing a Variable between Running Tasks](#)

## Passing a Variable between Running Tasks

You can pass an individual variable value from one task to another by using this option.

The value of the variable in the first running task becomes the input for the variable in a second task. This feature is important when tasks are run in a nested manner.

To pass a variable between running tasks, follow these steps:

1. In the Run Task command, select the Variable radio button.
2. In the Create variable association field, select the variable from list in Main Task that has to be passed on to the Run Task variable.  
Note: The same type of variable should be defined in both tasks.
3. Click Save.

Related tasks

[Using the Run Task Command](#)

Related reference

[Using Variables with IF-Else and LOOP Commands](#)

## Using Array Variable in Loop Command

After Array Type variables are created, you can process them in automated tasks using Loop command.

### Using Direct Assignment Array Variable

1. Open the Workbench.
2. Create an array variable using [Array Type Variables](#) from Tools > Variable Manager (we'll call it '\$Student\_Data\$').
3. Double-click the Loop command and select the option Times.
4. Press F2 to insert the \$ArrayRow\$ variable and select the Array Variable as \$Student\_Data\$.
5. Create a value variable (we'll call it \$row\$) to save the data that is fetched from the rows.

6. Double-click the Variable Operation command and press F2 to select \$Counter\$ variable under Specify value.
7. Double-click the Loop command again and select the option Times.
8. Press F2 to insert the \$ArrayColumn\$ variable and select the Array Variable as \$Student\_Data\$.
9. Double-click the Message command and press F2 to insert \$Student\_Data\$ variable. You will see that Array variable option dialogue box appears. Press F2 to select \$row\$ variable in Row Value and \$Counter\$ variable in Column Value.
10. Click OK to save the values and click Save to save the message.

#### Using Read from Text File Array Variable

1. Open the Workbench.
2. Create an array variable using [Array Type Variables](#) option from Tools > Variable Manager (we'll call it \$Sports\_team\$).
3. Double-click the Loop command and select the option Times.
4. Press F2 to insert the \$ArrayRow\$ variable and select the Array Variable as \$Sports\_team\$.
5. Create a value variable (we'll call it \$row\$) to save the data that is fetched from the rows.
6. Double-click the Variable Operation command and press F2 to select \$Counter\$ variable under Specify value.
7. Double-click the Loop command again and select the option Times.
8. Press F2 to insert the \$ArrayColumn\$ variable and select the Array Variable as \$Sports\_team\$.
9. Double-click the Message command and press F2 to insert \$Sports\_team\$ variable. You will see that Array variable option dialogue box appears. Press F2 to select \$row\$ variable in Row Value and \$Counter\$ variable in Column Value.
10. Click OK to save the values and click Save to save the message.

#### Using Read from CSV/Excel Array Variable

1. Open the Workbench.
2. Create an array variable using [Array Type Variables](#) option from Tools > Variable Manager (we'll call it \$Employee\_Data\$).
3. Double-click the Loop command and select the option Times.
4. Press F2 to insert the \$ArrayRow\$ variable and select the Array Variable as \$Employee\_Data\$.
5. Create a value variable (we'll call it \$row\$) to save the data that is fetched from the rows.
6. Double-click the Variable Operation command and press F2 to select \$Counter\$ variable under Specify value.
7. Double-click the Loop command again and select the option Times.
8. Press F2 to insert the \$ArrayColumn\$ variable and select the Array Variable as \$Employee\_Data\$.
9. Double-click the Message command and press F2 to insert \$Employee\_Data\$ variable. You will see that Array variable option dialogue box appears. Press F2 to select \$row\$ variable in Row Value and \$Counter\$ variable in Column Value.
10. Click OK to save the values and click Save to save the message.

#### Using Read from Database Array Variable

1. Open the Workbench.
2. Create an array variable using [Array Type Variables](#) option from Tools > Variable Manager (we'll call it \$Employee\$).
3. Double-click the Loop command and select the option Condition.
4. From the 'Loop While' dialogue box, select Variable option.
5. Click on Edit to select the Loop Condition.

- 
6. Select the appropriate variable, operator and value. For reference, see the following image:
  7. To display the values of the variable, you can use Message Box.

## Using Array Type Variables

An array variable is a two-dimensional variable that holds multiple values in a table of rows and columns. Arrays are very powerful for creating staging areas for data that need to be retrieved by your process as it runs.

Common uses of array variables include:

- Extracting data from web pages
- Extracting many rows of data from an Excel spreadsheet or a database
- Read or write data from/to a legacy system, an ERP system, or another application
- Filling out order forms with different fields from Excel to Database

The values can represent either text or numeric data.

After you create the variable, you can use it by inserting the variable in several of the MetaBot commands.

When the value of the variable is modified, this value is reflected in any subsequent commands that are run by the task.

## Creating an Array Type Variable

You can create an array type variable in one of two ways:

- [Using direct assignment](#)
- [Using a text file](#)

### Direct Assignment

When the values of an array variable need to be defined directly, you can opt to use 'Value' Array type variable. This is termed as 'Direct Assignment'.

To create an array type variable using direct assignment, follow these steps:

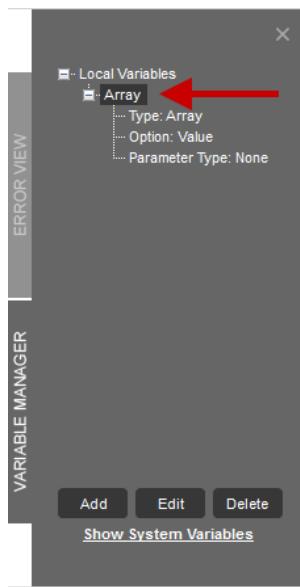
1. In the Logic Editor, click on the Variable Manager tab on the right side.
2. Click on the Add button. The 'Add Variable' window is displayed.
3. Select type 'Array'.
4. Enter a name for the variable. The name must begin with an alphabet and should not contain spaces.
5. Select how you want the array to be created. Default selection is 'Value' which indicates that you will define the values of this variable directly in it. .
6. Specify the number of rows and columns in the field provided. Default values are 1 X 1.
7. Click the Initialize Values button. The Array Value Details window is displayed based on the rows and columns provided in step 6.

8. Enter the values for each cell.

Tip: You can modify the array dimensions using the Add Row, Add Column, Delete Row, and Delete Column buttons.

9. Click the Save button to save the values.
10. Click the Save button in the Add Variable window to save the Array variable.

After the variable is saved, it is displayed in the Local Variables section of the Variable Manager.



If you don't want to specify the value of the variable at the time you create the variable, MetaBot Designer allows you to set the values of variables using a text file. This is described in the next section.

## Reading from a Text File

Create an array type variable using text file assignment when you want to read values from a specified text file into the array variable while the task is running. The text file is used to define the array variable.

To create an array type variable using text file assignment, follow these steps:

1. Determine the text file that you will use for assigning values.
2.
  - For Rows enter the data in a new line.
  - For Columns use comma separated values.
  - Example: sports\_team.txt
3. In the Task Editor, click on the Variable Manager tab on the right side.
4. Click on the Add button. The 'Add Variable' window is displayed.
5. Select type 'Array'.
6. Enter a name for the variable. The name must begin with an alphabet character and should not contain spaces.

7. Select 'Read from text file' from the list.
8. In the Select File field, browse to the file or type the file path for the required text file. Use the Open File button to view the selected text file or to modify it.
9. Click Save.

## Inserting Array Variables in Screens and DLLs

You can insert Array Variables while creating Logic in the Logic Editor. It can be used to assign values in Screens and/or DLLs.



**Tip:** You can insert rows and columns in MetaBot Commands for a Screen. However, when used with a DLL, you can insert only a single column to the Array type variable during assignment.

1. Adding an Array variable to a Screen - You can add an Array variable in Screens via MetaBot commands; namely Message Box, String Operation, and Variable Operation. You can also assign a variable in the Screen directly in the property window as shown:
2. Adding an Array variable to a Dll - You can insert an Array variable while inputting values by pressing the function key 'F2' as shown:

### Create new variables

Create new variables for an automation from the Variable Manager.

### Procedure

1. Go to Workbench – Variable Manager panel.
2. Click Add button at bottom or right-click on an existing variable.
3. Select Add.
4. In the Add Variable window, the Create New Variable option is selected by default.
5. Select the variable type.
6. Enter a name, and select the method for determining the value of the variable.
7. By default, the variable is disabled for data output and Analytics.
  - **11.3.2** Select Include in Output to pass the value of the variable at the end of bot execution back to the Bot Deployment API.  
Remember: By default the Include in Output option is not shown in the Add Variable window. It is displayed only when the Allow bot output setting is enabled in the Enterprise Control Room.
  - Select Log For Analytics to use the variable for data analysis.

### Related reference

[Reinitializing Variables](#)

[Reading Variables from an External File](#)

[Watching Variables](#)

[Variable usage considerations](#)

### Related information

[Assigning Variables in a Task](#)

[Resetting System Variables](#)

## Variable usage considerations

To use variables in your TaskBots and MetaBots consider important facts.

- The \$ signs that surround the variable name indicates that the text inside should be treated as a variable.
- When the TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.
- All command fields with the light bulb icon support variables.
- When you want to insert a variable, use the F2 function key to list all user and system variables that are available for selection.
- Variable values can be verified in debug mode by using the Watching Variables feature, which displays the run-time values for the selected variables.
- After creating a variable, you can use it within your bots using most Automation Anywhere commands.

Related reference

[Watching Variables](#)

## Using special features

Refer to each feature below for more detail.

- [Using the OCR Feature](#)
- [Using Image Recognition](#)

Use the Image Recognition feature to compare many large images and automate application processes using visual elements.

- [Using SnapPoint](#)
- [Using the Report Designer](#)
- [Using the Workflow Designer](#)
- [Using the ROI Calculator](#)

Use the ROI Calculator as a planning tool that calculates your return on investment (ROI) on process improvement.

- [Using SAP BAPI manager](#)

SAP BAPI Manager in Automation Anywhere Enterprise client allows you to manage custom and default SAP Business Application Programming Interface (BAPI)s. The SAP BAPI Manager contains more than 2000 default BAPIs that are displayed under various categories, modules, and operation types. You can add additional modules, categories, operations and BAPI, as needed.

## Using the OCR Feature

The OCR Feature command provides the following options:

- Capture Window: Specify the window title. Automation Anywhere captures the window as an image.
- Capture Area: Specify a specific area of the window to capture.
- Capture Image By Path: To extract text that is contained within an image that is stored on your local or network drive, specify the location of the file. The drive must be accessible when you run the task.
- Capture Image by URL: Specify a website URL that contains the image you want to capture.

## Using Keywords to Identify Captured Text

To make specifying the target text to capture easier, use the Before and After keywords. For example, in the text string "Name: ABC Inc. Location:", to copy only "ABC Inc.", specify Before = "Location" and After = "Name:". You can also trim the captured text to remove leading and trailing spaces.

The screenshot shows the 'OCR' configuration interface. On the left, under 'Step 1: Select Option', 'Capture Area' is selected. Under 'Step 2: Select window', 'ocr\_img - Windows Photo Viewer' is chosen, and 'TESSERACT' is selected as the 'OCR Engine'. Advanced settings include enabling image pre-processing (auto-threshold) with a threshold of 0. In 'Step 3: Assign the captured text to a variable when the task runs', there are options to 'Filter the captured text' and 'Trim the captured text', both of which are unchecked. The 'Assign the value to an existing variable' dropdown is set to 'Prompt-Assignment'. On the right, the 'Image Preview' shows a stack of three booklets with titles like 'EVOLVING Maturity OF ROBOTIC PROCESS AUTOMATION' and 'FROM ZERO TO MASTERY'. The 'Captured Text' panel displays the extracted text: 'EVOLVING Maturity OF ROBOTIC PROCESS AUTOMATION Get a crash course in automation with this eLI-in-one RPA starter pack, designed to help you understand, employ, and execute successful automation initiatives.' Below the preview and text panel are 'Save' and 'Cancel' buttons.

Related reference

[Using Image Recognition](#)

Related information

[Using SnapPoint](#)

[Using the Report Designer](#)

[Using the ROI Calculator](#)

## Using Image Recognition

Use the Image Recognition feature to compare many large images and automate application processes using visual elements.

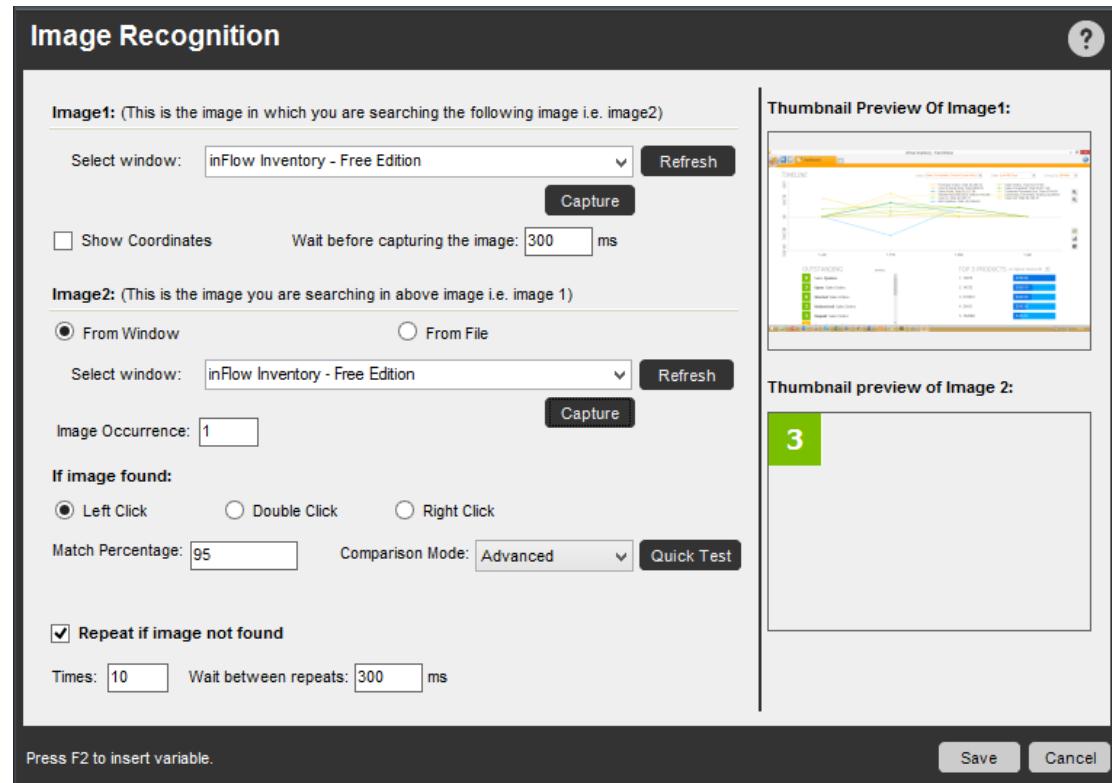
For automated testing, Image Recognition can be used for user interface validation. You can compare a current application screen to an expected application screen, as well as ensure that all user interface elements are valid.

Using Image Recognition, you can do the following:

- Locate an image within another image that is saved in a file or captured from a window at run time. The image is captured dynamically at run time in a window that you specify.
- Specify the minimum percentage match for which you want the command to return true.
- Left-click, right-click, or double-click the image if it is found within the larger image.
- Capture images from BMP, JPG, and GIF file formats.
- Compare images with two modes: Tolerance and Comparison Mode.
  - Tolerance Mode: Compares images having light and dark colors. It performs the color grading check.

Specifying a 0% tolerance compares exact pixel color with the source image. Specifying a tolerance of 10% compares the 10% (plus/minus) color shade with the source image.

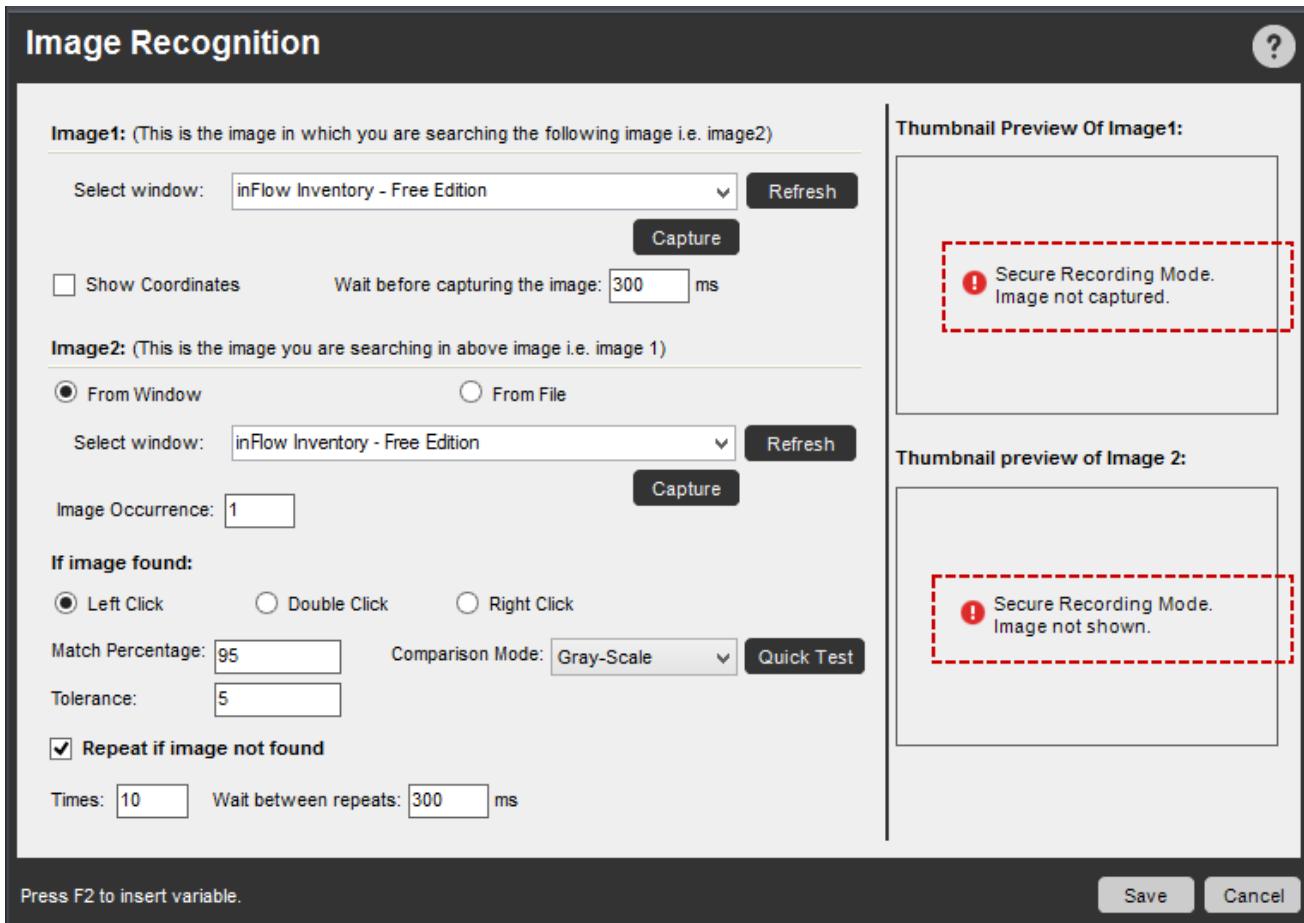
- Comparison Mode: Provides the following options:
  - Normal mode: Compares the RGB components of the pixels with the source.
  - Gray-scaled mode: Converts the pixel to gray scale and then performs a comparison.
  - Monochrome mode: Converts the pixel to either black or white and performs the comparison.



When you 'Enable' Secure Recording

Note: If you enable 'Secure Recording mode', 'Image1' and 'Image2' are not captured. [Secure recording mode.](#)

While 'Secure Recording mode' is enabled and you try to capture 'Image2' an error message appears "Secure Recording mode. Ensure that the 'Image2' does not show any secure data."



## Also See...

Related information

[Using the OCR Feature](#)

[Using SnapPoint](#)

[Using the Report Designer](#)

[Using the ROI Calculator](#)

## Using SnapPoint

Use the SnapPoint feature to add screen shots to an automation task or to capture screen shots when a task is running.

### Capturing images while recording tasks

Automation Anywhere provides the latest technology for capturing and displaying screen shots as you create automation tasks.

Note: If you enable Secure Recording mode, screen shots are not captured. [Secure recording mode](#)

To capture screen shots, click Tools > Options > Advanced Settings. Click Capture Screenshots While Recording.

You can resize images and move them inside the Workbench to a desired location. The captured image is the active window during recording, and shows you where mouse pointer is located.

Consider the following example for line number 17 in the task. When you click Mouse Click: Left Button, the corresponding image shows the Windows calculator.

The screenshot shows the 'Task Actions List' interface. At the top, there are tabs for 'NORMAL' and 'VISUALIZE'. Below the tabs are 'FILTERS' checkboxes for 'Mouse Moves', 'Keystrokes', 'Mouse Clicks', 'Delays', and 'Other'. There is also a 'Windows' dropdown set to 'All'. A camera icon is visible on the left side of the list.

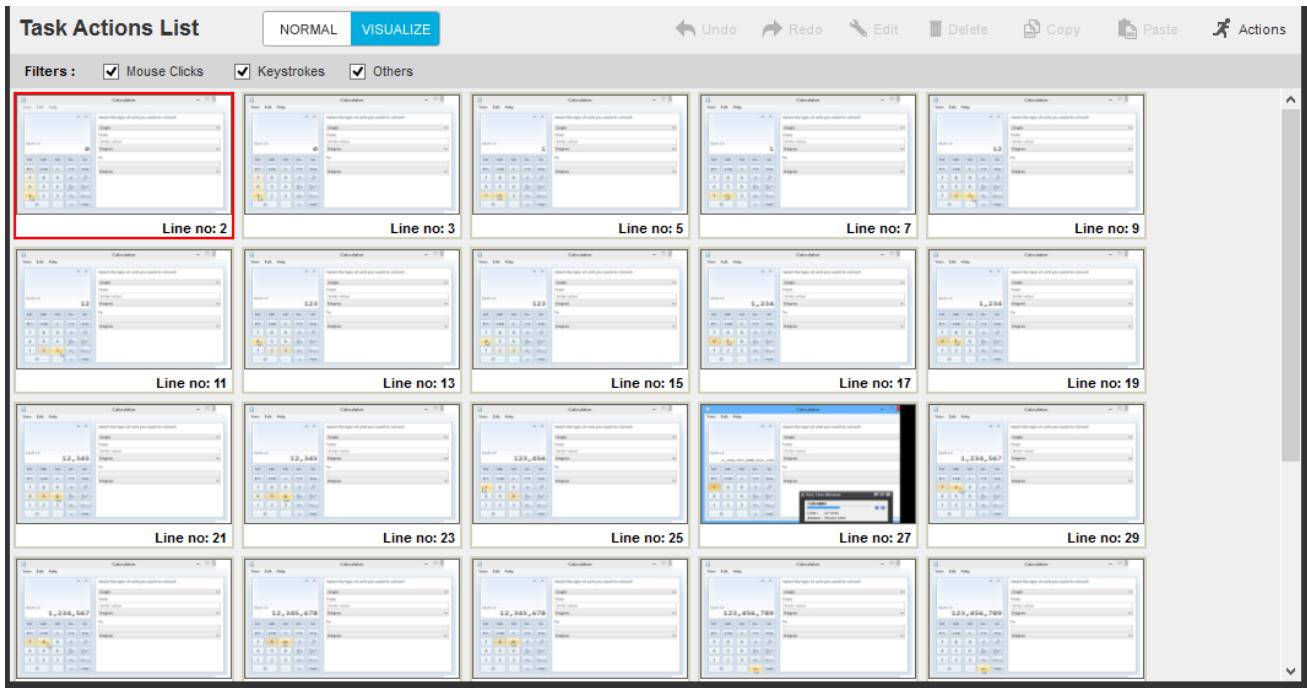
The list displays 30 actions, numbered 7 to 30. Action 17 is highlighted in blue. The actions are:

- 7: Mouse Click: Left Button (874,663) Pressed Up in "Calculator"
- 8: Mouse Move: (879,665) To (927,671)
- 9: Mouse Click: Left Button (927,671) Pressed Down in "Calculator"
- 10: Mouse Move: (927,670) To (906,666)
- 11: Mouse Click: Left Button (927,671) Pressed Up in "Calculator"
- 12: Mouse Move: (900,663) To (840,631)
- 13: Mouse Click: Left Button (840,631) Pressed Down in "Calculator"
- 14: Mouse Move: (841,632) To (846,632)
- 15: Mouse Click: Left Button (840,631) Pressed Up in "Calculator"
- 16: Mouse Move: (848,632) To (879,629)
- 17: Mouse Click: Left Button (879,629) Pressed Down in "Calculator" (highlighted)
- 18: Mouse Move: (879,629) To (901,636)
- 19: Mouse Click: Left Button (879,629) Pressed Up in "Calculator"
- 20: Mouse Move: (904,636) To (917,636)
- 21: Mouse Click: Left Button (917,636) Pressed Down in "Calculator"
- 22: Mouse Move: (917,636) To (863,618)
- 23: Mouse Click: Left Button (917,636) Pressed Up in "Calculator"
- 24: Mouse Move: (857,615) To (831,603)
- 25: Mouse Click: Left Button (831,603) Pressed Down in "Calculator"
- 26: Mouse Move: (831,603) To (856,606)
- 27: Mouse Click: Left Button (831,603) Pressed Up in "Calculator"
- 28: Mouse Move: (861,606) To (891,606)
- 29: Mouse Click: Left Button (891,606) Pressed Down in "Calculator"
- 30: Mouse Move: (891,606) To (908,606)

On the right side of the interface, a 'Mouse Click Image' window is open, showing a screenshot of the Windows Calculator application.

## Using the Visualize tab

Use the Visualize tab in the Workbench to view a complete graphical layout of the current task. The following example displays a task when you click Start > Run > OK in the Run window, and then click number '1' in the calculator.



**11.3.3** The Visualize tab does not display SnapPoints or images captured during recording for protected bots. Instead the following message is shown:

You cannot set SnapPoints or visualize the images of this bot as it is protected however you can view or edit the variables value and/or view the bot dependencies only.

## Setting SnapPoints to refresh the images

When you create a task manually using the Workbench, or you modify a recorded task, the images that you captured during recording may not be the most recent. Automation Anywhere provides a convenient way to refresh the images called SnapPoints.

To set SnapPoints, click the Set SnapPoint button. You can now set SnapPoints in the column to the left of the line numbers, as shown below. When you run a task after setting SnapPoints, Automation Anywhere recaptures the images for those commands on which you set SnapPoints.

The images are captured after the task runs.

**Task Actions List**

		<b>NORMAL</b>	<b>VISUALIZE</b>
<b>FILTERS</b>	<input checked="" type="checkbox"/> Mouse Moves <input checked="" type="checkbox"/> Keystrokes <input checked="" type="checkbox"/> Mouse Clicks <input checked="" type="checkbox"/> Delays		
1	 Mouse Move: (716,300) To (843,667)		
2	 Mouse Click: Left Button (843,667) Pressed Down in "Calculator"		
3	 Mouse Click: Left Button (843,667) Pressed Up in "Calculator"		
4	 Mouse Move: (843,667) To (874,663)		
5	 Mouse Click: Left Button (874,663) Pressed Down in "Calculator"		
6	 Mouse Move: (875,663) To (877,665)		
7	 Mouse Click: Left Button (874,663) Pressed Up in "Calculator"		
8	 Mouse Move: (879,665) To (927,671)		
9	 Mouse Click: Left Button (927,671) Pressed Down in "Calculator"		
10	 Mouse Move: (927,670) To (906,666)		
11	 Mouse Click: Left Button (927,671) Pressed Up in "Calculator"		
12	 Mouse Move: (900,663) To (840,631)		
13	 Mouse Click: Left Button (840,631) Pressed Down in "Calculator"		
14	 Mouse Move: (841,632) To (846,632)		
15	 Mouse Click: Left Button (840,631) Pressed Up in "Calculator"		
16	 Mouse Move: (848,632) To (879,629)		
17	 Mouse Click: Left Button (879,629) Pressed Down in "Calculator"		
18	 Mouse Move: (879,629) To (901,636)		
19	 Mouse Click: Left Button (879,629) Pressed Up in "Calculator"		
20	 Mouse Move: (904,636) To (917,636)		

### 11.3.3

Note: The Set SnapPoints option is not available for a protected bot.

## Commands that Support SnapPoints

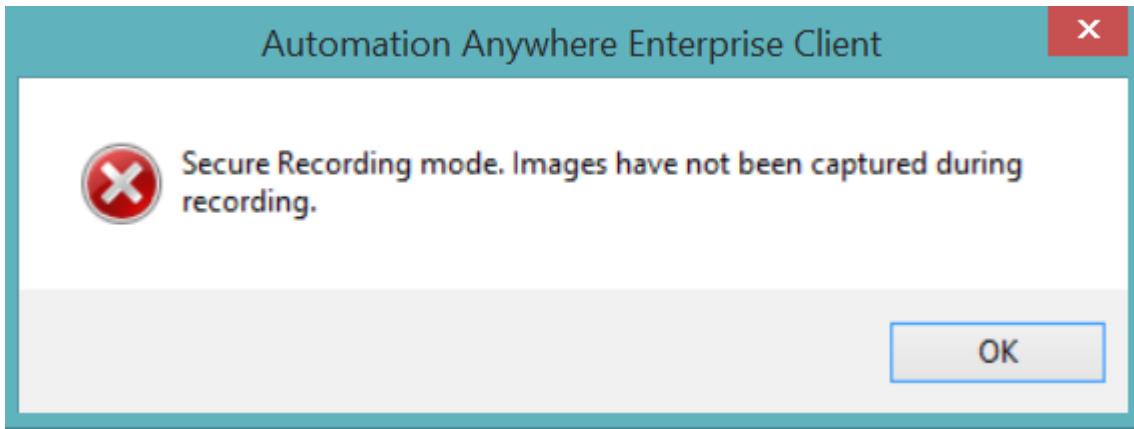
The following commands support SnapPoints:

- Keystrokes command
- Mouse command
- Prompt command
- Excel command
- Web Recorder command
- Windows Actions command
- Message Box command
- Manage Window Controls command

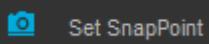
## When you 'Enable' Secure Recording

Note: If you enable 'Secure Recording mode', no images are captured. [Learn More](#) When you click on 'Visualize', it is disabled while 'Secure Recording' is on.

**NORMAL**    **VISUALIZE**    **ANALYZE**



Note: If the 'Secure Recording Mode' is enabled, 'SnapPoint' is disabled. Also, if you try to enable Snap view whilst 'Secure Recording Mode' is enabled, an error message "Secure Recording mode. Images have not been captured during recording" is shown.



Related information

[Using the Report Designer](#)  
[Using the ROI Calculator](#)

## Using the Report Designer

Use the Automation Anywhere Report Designer to run reports for your automation projects. These reports give a graphical representation of automated tasks over a period of time. It also displays the ROI for an organization using Automation Anywhere products.

- [What is a Report?](#)

Automation Anywhere provides graphical reports that display the status of tasks and workflows, as well as the ROI over time.

- [Running Reports](#)

Run a report for your automation projects using the Report Designer.

- [Saving Reports](#)

Save a report for your automation projects in the Report Designer.

- [Sending Email Notifications for Reports](#)

Send a report for your automation projects in the Report Designer.

- [Scheduling a Report to Run](#)

Using the Automation Anywhere scheduler, you can schedule a report to run at a specific time.

- [Triggering a Report to Run](#)

Run reports based on a trigger event.

- [Viewing a Report Graphically](#)

Automation Anywhere provides a step-by-step graphical view of all tasks run.

## What is a Report?

Automation Anywhere provides graphical reports that display the status of tasks and workflows, as well as the ROI over time.

Reports are important feature to measure the success and calculate the ROI that Automation Anywhere brings to your organization with respect to time.

You can view the following types of reports:

Task Run: Displays how many times a task has run successfully, and how many times it has failed during the period. You can view this report for:

- All Tasks saved in the default location, i.e., My Documents\Automation Anywhere\Automation Anywhere\My Tasks
- Tasks in a specified folder
- Selected tasks.

To graphically view your Task Run, see the Visualize Report.

Workflow Run: Displays how many times a workflow has run successfully and how many times it has failed during the period. You can view this report for:

- All workflows saved in the default location, i.e., My Documents\Automation Anywhere Files\Automation Anywhere Files\My Workflow
- Workflows in a specified folder
- Selected workflows

Task Timeline: Displays task history in a graphical time line. Select a task and time line to view the number of times a task was run or modified during the period. It also shows whether the task was created or deleted during that time. You can view this report for:

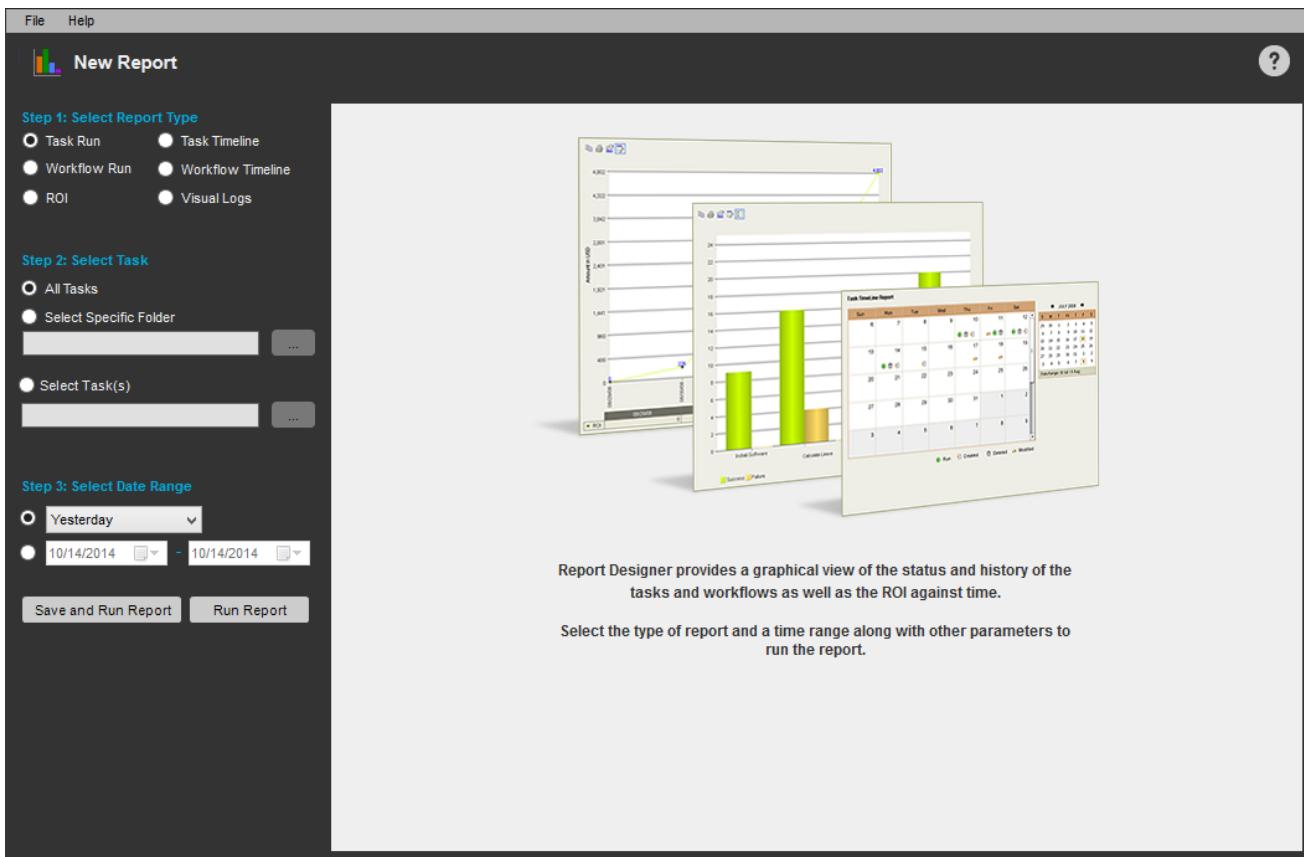
- All tasks saved in default location, i.e. My Documents\Automation Anywhere Files\Automation Anywhere Files\My Tasks
- Tasks in a specified folder
- Selected tasks

Workflow Timeline: Displays workflow history in a graphical time line. You can select a workflow and a time line to see the number of times the workflow was run or modified during the time period. It also tells you whether the workflow was created or deleted during that time. You can view this report for:

- All Workflows saved in default location, i.e. My Documents\Automation Anywhere Files\Automation Anywhere Files\My Workflow
- Workflows in a specified folder
- Selected workflows

ROI: Displays how much USD/Dollar Value has been saved by using Automation Anywhere during the time period.

Visual Logs: Graphically displays tasks that have run by providing step-by-step SnapPoints for each action in a task.



#### Related reference

[Running Reports](#)

[Saving Reports](#)

[Scheduling a Report to Run](#)

[Sending Email Notifications for Reports](#)

[Triggering a Report to Run](#)

#### Related information

[Viewing a Report Graphically](#)

## Running Reports

Run a report for your automation projects using the Report Designer.

### How do I run a report?

To run a report, simply specify your criteria in the Report Designer and click Run Report.

To run a saved report, double-click the report file in the Task List, or select the report in the Task List and click Run.

The screenshot shows the Automation Anywhere Enterprise client interface. At the top, there is a navigation bar with links for File, Edit, View, Tools, Help, and Feedback. Below the navigation bar, there are several icons: New (yellow sun), Record (red circle), Run (green play button), and Edit (yellow wrench). To the right of these icons, there is a status bar with three items: Web Recorder, Object Recorder, and ROI: \$1,609,007.56+. On the left side, there is a sidebar with sections for AUTOMATE and MANAGE. Under AUTOMATE, there are links for Repository and Reports. Under Reports, there is a link for My Reports, which is highlighted with a blue background. On the right side, there is a table titled "My Reports" with two rows of data:

File Name	Created At
ROI.rtdx	12/17/2013 14:50:24
taskrun.rtdx	02/11/2014 15:51:44

Related reference

[Running Reports](#)

[Saving Reports](#)

[Sending Email Notifications for Reports](#)

[Scheduling a Report to Run](#)

[Triggering a Report to Run](#)

Related information

[What is a Report?](#)

[Viewing a Report Graphically](#)

## Saving Reports

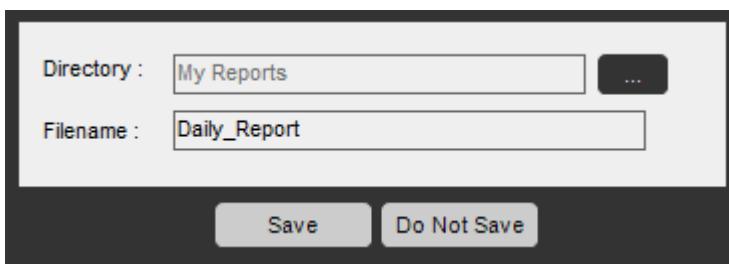
Save a report for your automation projects in the Report Designer.

## How do I save a report?

To save a report after specifying the criteria, click Save and Run Report.

Automation Anywhere stores your selections and saves the report as a template for future use.

If you want to save a report as an image, click the File menu and select Save As Image.



Related reference

[Triggering a Report to Run](#)

Related information

[Viewing a Report Graphically](#)

## Sending Email Notifications for Reports

Send a report for your automation projects in the Report Designer.

Using the Notification property, you can automatically send an email notification after a report completes.

The email includes the report as an image, as well as other helpful information.

Related reference

[Running Reports](#)

[Saving Reports](#)

[Sending Email Notifications for Reports](#)

[Scheduling a Report to Run](#)

[Triggering a Report to Run](#)

Related information

[What is a Report?](#)

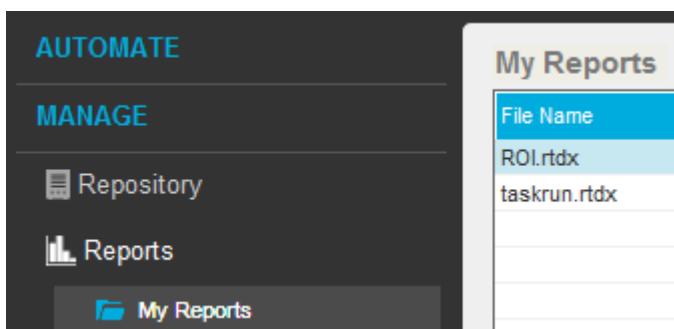
[Viewing a Report Graphically](#)

## Scheduling a Report to Run

Using the Automation Anywhere scheduler, you can schedule a report to run at a specific time.

To schedule a report to run, follow these steps:

1. In the Task List, select the report.



2. Select Schedule.
3. Specify the scheduling parameters.

Related reference

[Running Reports](#)

[Saving Reports](#)

[Sending Email Notifications for Reports](#)

[Scheduling a Report to Run](#)

[Triggering a Report to Run](#)

Related information

[What is a Report?](#)

[Viewing a Report Graphically](#)

## Triggering a Report to Run

Run reports based on a trigger event.

Use the Automation Anywhere trigger feature to trigger a report to run:

1. Select Manage > Reports > My Report, from the My Reports list, select the report.
2. Select Trigger.
3. Define your trigger. Select Trigger Type, Category, Action, and Value. Click Save.

Use the Notification property to send an email notification after the trigger event runs the report. For more information, see [Sending Email Notifications for Reports](#)

Related reference

[Running Reports](#)

[Saving Reports](#)

[Sending Email Notifications for Reports](#)

[Scheduling a Report to Run](#)

[Triggering a Report to Run](#)

Related information

[What is a Report?](#)

[Viewing a Report Graphically](#)

## Viewing a Report Graphically

Automation Anywhere provides a step-by-step graphical view of all tasks run.

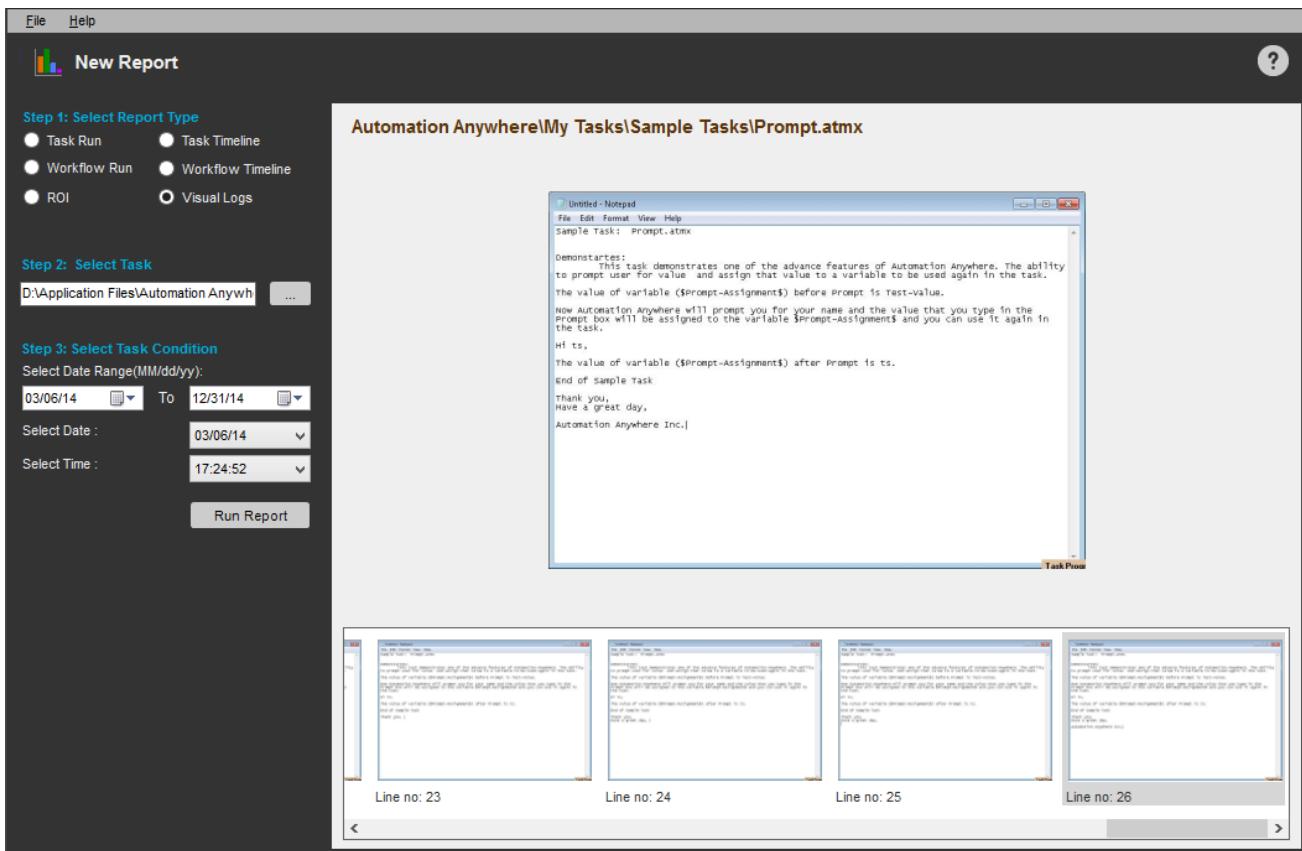
To turn on the Visualize view, follow these steps:

1. Click on the Tools menu, and select Options.
2. Click on Advanced Settings.
3. Check the 'Capture Screenshots While Recording a Task' check box.
4. Click the Apply and OK buttons.
5. To view your task graphically, simply click on the bar representing the task using the Task Run report view.

If SnapPoints are not supported by the task, a message is displayed to notify you immediately.

Using the Visualize Report, you can:

- View the number of days that the task has run during a specific date range.
- View a specific day and the number of times that a task has run during that day.
- Compare your tasks using all of the saved SnapPoints in the task folders (..My Documents\Automation Anywhere\SnapPoints).



## Using the Workflow Designer

To assist you in designing and improving your business workflows, Automation Anywhere provides a Workflow Designer tool. The Workflow Designer helps you build Workflow flow diagrams in a graphical environment. You can subsequently use these Workflows to build and run automated Workflows using Automation Anywhere.

### Overview

A Workflow shows a high-level, graphical view of your business or IT Workflow, with a representation of conditional logic and Workflow flow. Some Workflows might be simple, some more complex.

The Workflow Designer provides an intuitive, drag-and-drop interface to help you quickly design your workflows.

### Creating a Workflow?

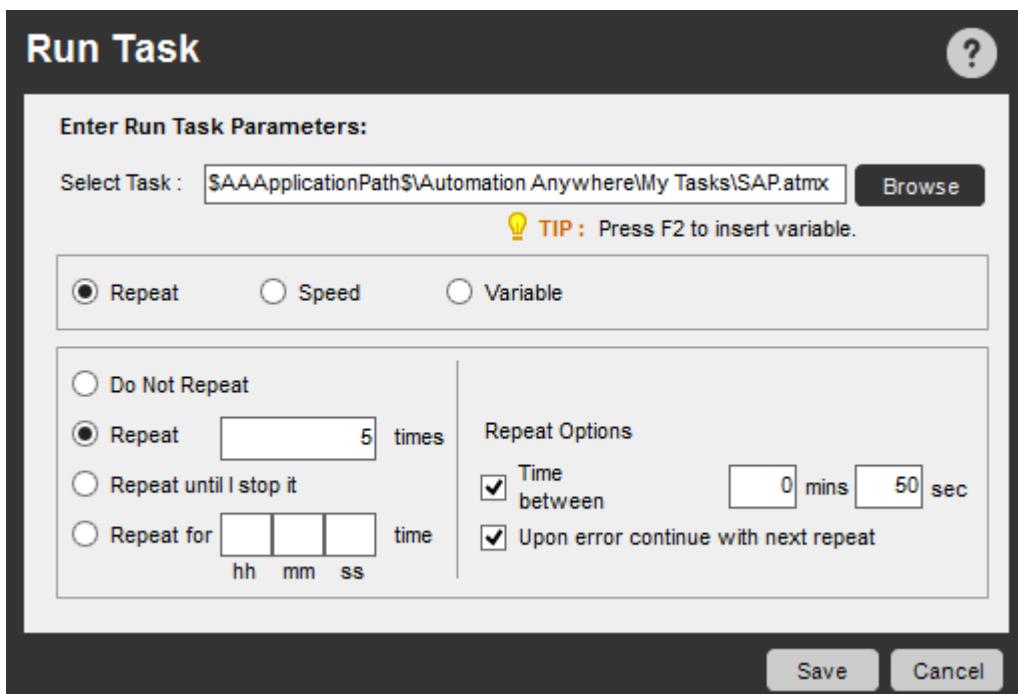
To create a new Workflow, follow these steps:

1. Click on the Tools menu and select Workflow Designer. The Workflow Designer provides the following design objects:

- Start: The starting point for the Workflow. Each Workflow can have only one Start object.

 Start

- Run Task: Runs a previously built task (.atmx file). Before proceeding to the next Workflow step, the Workflow stops until the Run Task command is completely finished.

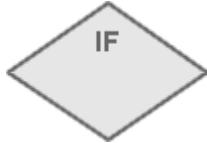
 Run Task


When you insert a Run Task object, it displays one Successful arrow and one Unsuccessful arrow. Both arrows are required for a complete Workflow. If you accidentally delete one of these arrows, move the mouse over the Run Task object and pull another arrow over to connect it with the desired object.



Note: You can edit a task from the Run Task list by right-clicking the task and viewing the menu.

- Conditional (If): Provides an event condition on which the subsequent steps in the Workflow depend. Based on the result of the condition (True or False), the Workflow moves along the appropriate path to next steps.



When you insert a Conditional object, it displays one True arrow and one False arrow. Both arrows are required. If you accidentally delete one of the arrows, move the mouse over the object and pull another arrow over to connect it with the desired object.

Use multiple AND or OR conditions\*- You can include 'AND' or 'OR' conditions when you wish to include multiple conditions in the same command.

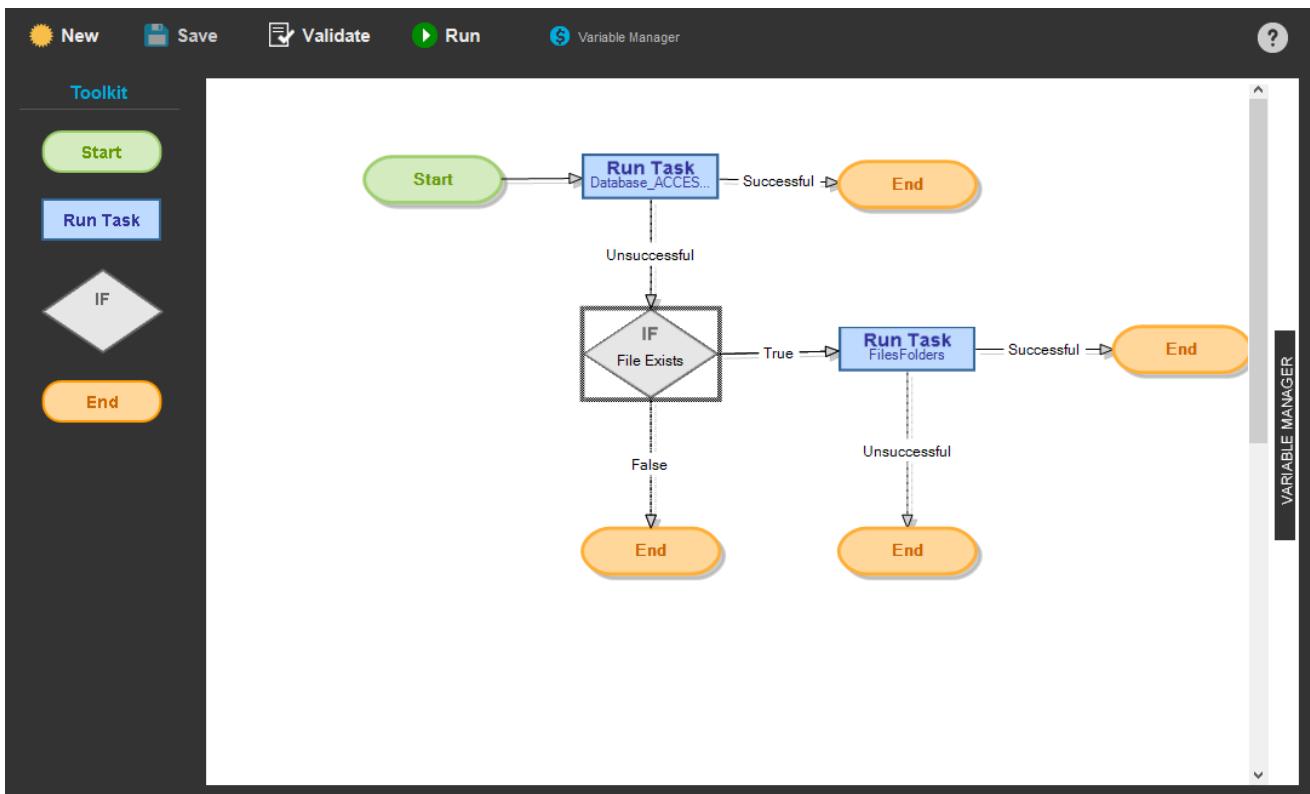
\* Available from version 7.5.2 onward

Refer to [IF/ELSE command](#).

- End: The end of the Workflow. When the Workflow reaches this object, execution is stopped.



- Arrows: Connects objects and pathways in the Workflow. To insert an arrow from any object, move the mouse over the object until the mouse icon changes to a hand icon:

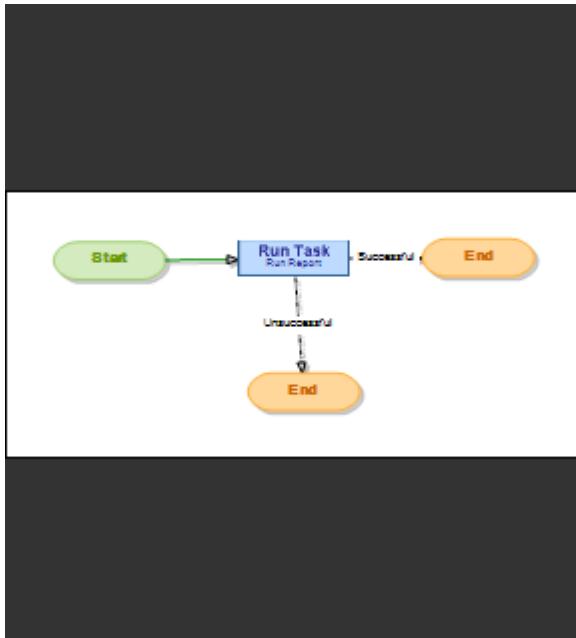


Tip: Prior to running a Workflow or exiting the Workflow Designer, always validate the Workflow. Validation ensures that your Workflow objects are correctly connected and that errors do not occur.

## Running a Workflow

To run a Workflow from the Workflow Designer, click on Run or double-click the Workflow file in the Task List.

When you run the Workflow within the Workflow Designer, Automation Anywhere indicates the path followed in the Workflow. For example, you can easily see whether a True or False condition occurs.



After a Workflow has completed a run, the Workflow Designer highlights the complete path in color.



## Repeating a Workflow

To repeat a Workflow, use the Repeat property. The Workflow will run again.

## Sending Email Notification for a Workflow

To send an email notification when a Workflow run is complete, use the Notification property.

## Saving a Workflow as an Image

To save a Workflow as an image, click on the File menu and select Save as Image.

## Printing a Workflow

To print a Workflow, click on the File menu and select Print.

## Scheduling a Workflow to Run

You can schedule a Workflow to run using the Automation Anywhere Scheduler. Refer to [Scheduling Tasks to Run](#).

## Triggering a Workflow to Run

You can use triggers to schedule a Workflow to run. Refer to [Trigger](#)

## Associating Workflow Variables to Task Variables

Workflow variables can be associated with various tasks. The associated variable is clearly shown in Run Task command.

Only type of variable association should be same, the names of variables can differ.

Steps to associate Workflow variable to task variables:

1. Click the Run Task command.
2. Select Task using Browse.
3. Select Variable option as action.
4. Create variable association section appears.
5. Select Worflow Variables from drop down list and associate them with the drop down of list for the Task Variables.

Use the 'Quick Map' button if you have a large set of variables to associate \*.

\* Available from version 8.1 onward.

Refer to [Run Task command](#).

6. Associate workflow variables to task variables using Run Task > Variable option.
  - Both drop downs will only display Value type of variables defined.
1. Use Add button to add more variable association of Workflow to Task.
2. Select an association and use Delete button, to remove it.

Note:

1. If there are changes to the task variables type or source, the association will be invalid.
2. If there is change in application path of a task, the association will be updated automatically. However, one needs to manually Save the workflow.
3. The SAVE button is enabled for these workflows with an appropriate message.

Related information

[Using SnapPoint](#)

[Using the Report Designer](#)

[Using the ROI Calculator](#)

[Using Variables](#)

## Using the ROI Calculator

Use the ROI Calculator as a planning tool that calculates your return on investment (ROI) on process improvement.

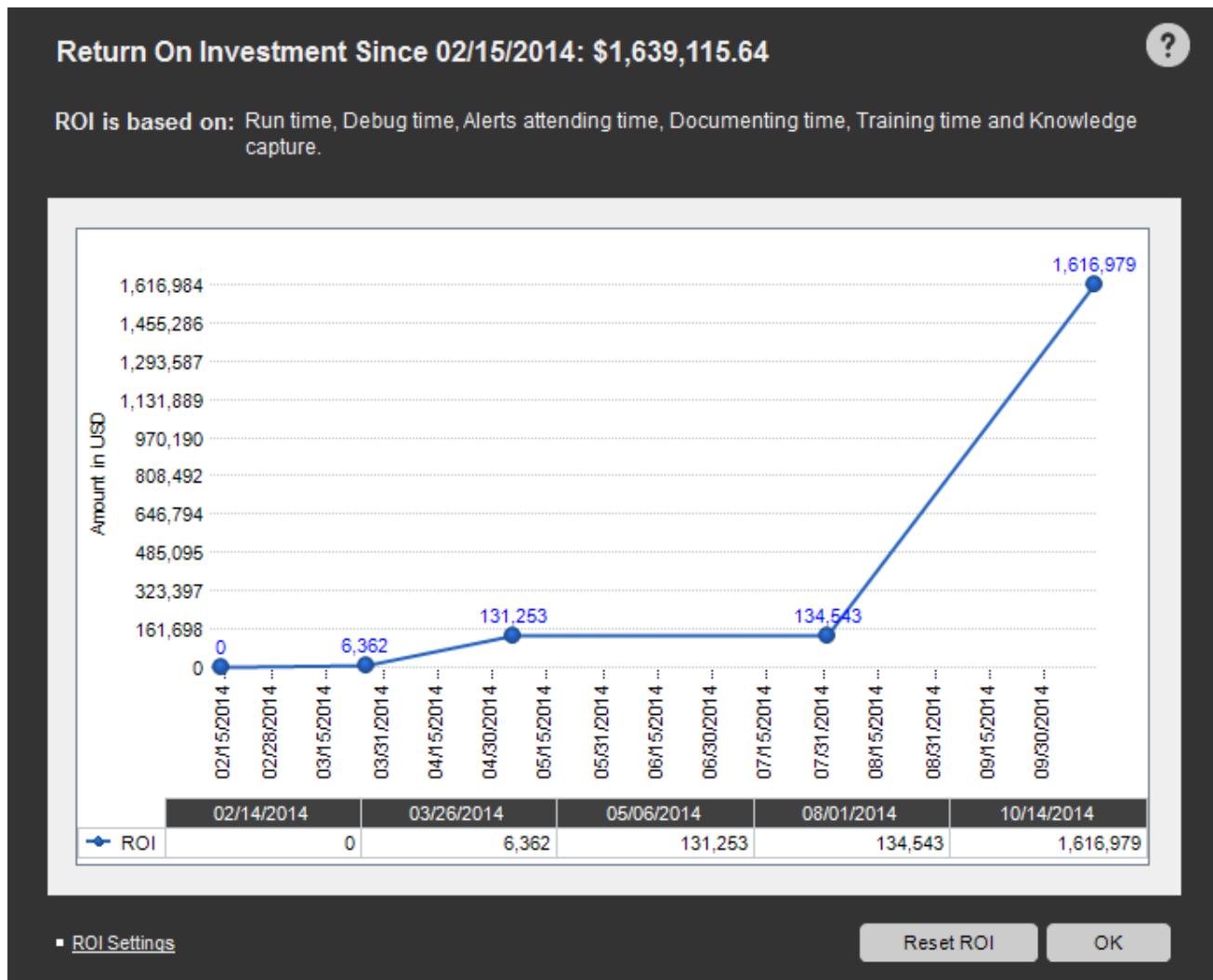
The ROI calculator makes the following calculations:

- Resource costs for time saved
- Reduced error rates
- Automated troubleshooting
- Automated documentation
- Resource realignment
- Training benefits
- Knowledge capture

Automation Anywhere calculates the ROI based on the results of automating processes. The ROI is a cumulative dollar amount from running tasks.

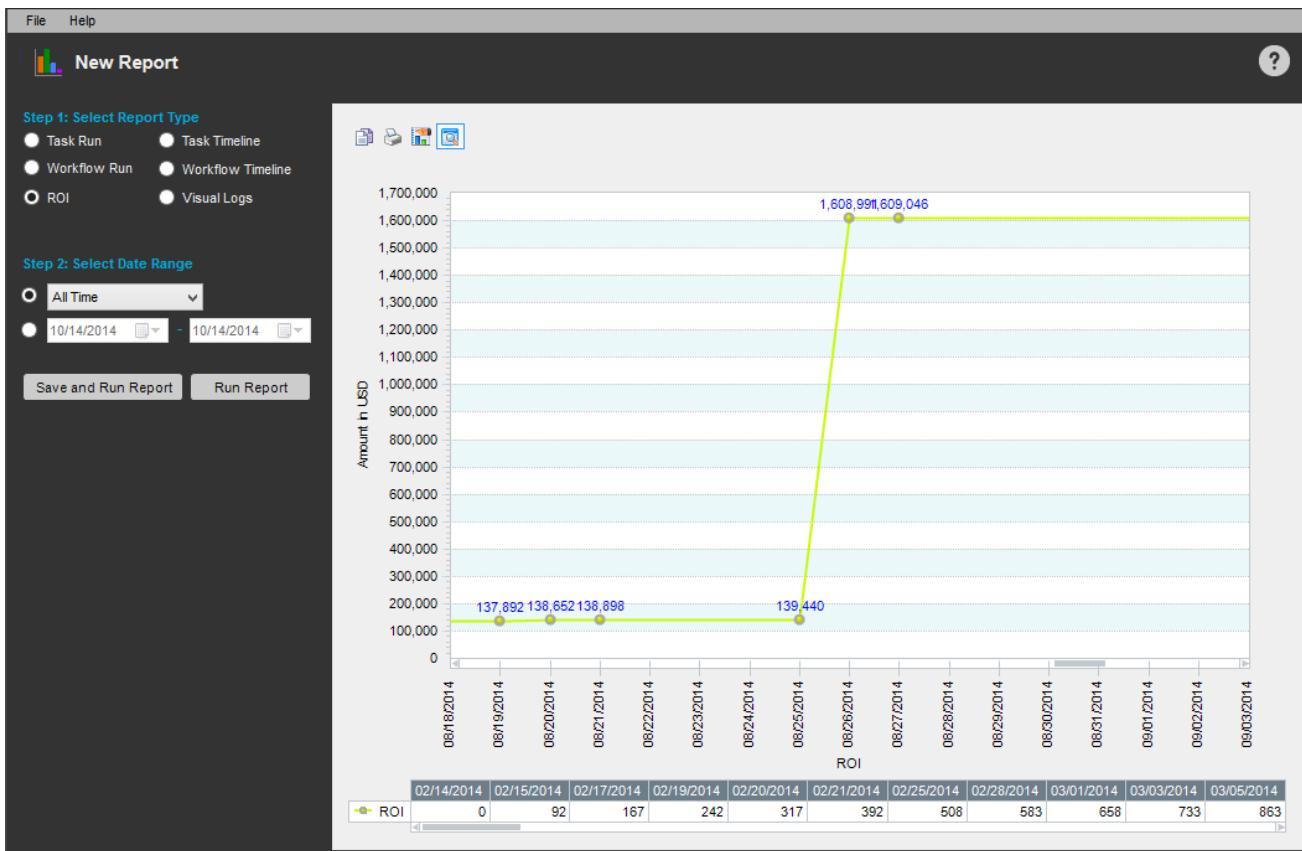
As the basis for the ROI calculations, you can set the hourly personnel rate to calculate hourly savings. For more information, see the 'ROI Settings' in the ROI Calculator.

To make the ROI calculations easy to understand and useful in sharing, you can view the ROI as a graphical chart.



Note: You can reset the ROI at any time by clicking 'Reset ROI' button.

You can also generate ROI related reports using the Report Designer as shown:



Related information

[Using SnapPoint](#)

[Using the Report Designer](#)

## Using SAP BAPI manager

SAP BAPI Manager in Automation Anywhere Enterprise client allows you to manage custom and default SAP Business Application Programming Interface (BAPI)s. The SAP BAPI Manager contains more than 2000 default BAPIs that are displayed under various categories, modules, and operation types. You can add additional modules, categories, operations and BAPI, as needed.

### Prerequisites

To add a custom BAPI for a new module:

### Procedure

- On the Enterprise client window, click SAP BAPI Manager from the Tools menu.  
The SAP BAPI Manager dialog box appears.
- Right-click the SAP Module node and select Add Module from the menu.  
The Add Module dialog box appears.
- Enter a name in the New Module Name field, and then click Save.  
The system adds the module.

4. Right-click the recently added module and select Add Category from the menu.  
The Add Category dialog box appears.
5. Enter a name in the New Category Name field, and then click Save.  
The system adds the category under the selected module.
6. Right-click the recently added category and select Add Operation from the menu.  
The Add Operation dialog box appears.
7. Enter a name in the New Operation Name field, and then click Save.  
The system adds the operation under the selected category.
8. Right-click the recently added operation and select Add BAPI from the menu.  
The Add BAPI dialog box appears.
9. Enter a name in the Enter BAPI Name field.
10. Select an option from the Connection Type list, to specify the connection type to be used.  
Following options are available:
  - Custom Application Server
  - Group/Server Selection

The system displays relevant fields based on the option you have selected.

11. Enter details for the following fields:  
For the Custom Application Server option:

- Application Server Host
- Client
- User Name
- Password
- System Number
- Language
- System ID
- SAP Router String

For the Group/Server Selection option:

- Message Server Host
- Client
- User Name
- Password
- System Number
- Language
- System ID
- SAP Router String
- Gateway Host
- Logon Group

12. Click Test Connection, to test the connection, and then click Save.

Note: This procedure, Test Connection, requires that the `sapnco.dll` and `sapnco_utils.dll` files are copied into installation path and unlocked for usage permission. See [Using BAPI to automate tasks in SAP](#).

- [Rename module in BAPI manager](#)

You can rename a module that is available in the BAPI Manager.

- [Deleting module in BAPI manager](#)

You can delete a module from the BAPI Manager.

## Rename module in BAPI manager

You can rename a module that is available in the BAPI Manager.

### Prerequisites

To rename a module:

### Procedure

1. On the Enterprise client window, click SAP BAPI Manager from the Tools menu.  
The SAP BAPI Manager dialog box appears.
2. Right-click the module you want to rename, and then select Rename Module from the menu.  
The Rename Module dialog box appears.
3. Enter the new name for the module in the New Module Name field, and then click Save.

### Next steps

You can use the above procedure to rename category, operation, and description of a BAPI. The option available on right-click and the name of the dialog box displayed varies based on the entity you are renaming. For example, if you right-click a category, the system displays Rename Category option and Rename Category dialog box.

## Deleting module in BAPI manager

You can delete a module from the BAPI Manager.

### Prerequisites

To delete a module from the BAPI manager:

### Procedure

1. On the Enterprise client window, click SAP BAPI Manager from the Tools menu.  
The SAP BAPI Manager dialog box appears.
2. Right-click the module you want to delete, and then select Delete Module from the menu.  
The system deletes the module after confirmation.

### Next steps

You can use the above procedure to delete category, operation, and BAPI.

## Bot Store integration overview

The seamless integration of the Bot Store enables you to access the Bot Store directly from the Enterprise client. In the Enterprise client, you can download bots and Digital Workers from the Bot Store or create and package Digital Workers and bots to be uploaded to the Bot Store.

## How does Bot Store integration help?

- Discover and download pre-built, ready-to-use [Digital Workers](#) and bot packages from the [Bot Store](#) to the [Enterprise client](#).
- Leverage the 'one-stop-shop' solution to configure and run the downloaded bot in the Enterprise client.
- Create bots or Digital Workers for the Bot Store marketplace within the default Bot Store folder in the Enterprise client as per the directory structure guidelines.
- Create a zip package of the bot or Digital Worker along with its dependencies prior to publishing the bots or Digital Workers for end-user consumption.
- Enforce license management by marking a [TaskBot](#) or [MetaBot](#) as Protected to protect the Intellectual Property (IP) of the business logic contained within the bot.

## What you need to know about Digital Workers and protected bots

### Digital Workers

Digital Workers are a set of role-related automation tasks that are performed in a sequence.

Digital Workers automate entire processes, do multiple tasks in a set of sequences, and are ready-to-deploy and download from the Automation Anywhere [Bot Store](#).

For example, an Accounts Payable Digital Worker can be used to automate invoice processing, payment processing, and record management.

### Protected bots

The Bot Store offers developers, who build Digital Workers or bot packages, a monetization opportunity by protecting the business logic contained within the bots. The commands within the protected bots are not visible in the Enterprise client and are not allowed to be edited by the purchaser.

- [Organizing Bot Store Digital Workers and bots](#)

A Bot Store folder is now available by default under My Tasks in the Enterprise client. Create the Master Bot and all other dependent files within a specific directory under the default Bot Store folder in the Enterprise client. This enables you to successfully package Digital Workers or bots before submitting them to the Bot Store.

- [Viewing and playing protected bots](#)

The code of a protected bot downloaded from the Bot Store cannot be copied and redistributed by others. Automation Anywhere supports protection of the Intellectual Property (IP) rights of the original creator of the Digital Worker or bot, by ensuring the bot code is not exposed.

- [Creating a bot package](#)

Enhance your experience to seamlessly create a zip package of a bot or Digital Worker with the dependencies from the Automation Anywhere Enterprise client, and then submit it to the Bot Store when you want to publish the bots or Digital Worker for the end users.

### Related concepts

[Viewing and playing protected bots](#)

[Automation Anywhere Digital Worker overview](#)

[Digital Worker packaging](#)

## Organizing Bot Store Digital Workers and bots

A Bot Store folder is now available by default under My Tasks in the Enterprise client. Create the Master Bot and all other dependent files within a specific directory under the default Bot Store folder in the Enterprise client. This enables you to successfully package Digital Workers or bots before submitting them to the Bot Store.

Bot developers can create many types of Digital Workers or bots in the Bot Store folder to submit to the Bot Store. Therefore, it is important to store the Master Bot and the dependent files in this folder, so that the Digital Worker or bot package structure is consistent with the existing bots in the Bot Store.

Note: You can create sub-folders under the Bot Store folder, but you cannot delete or rename the Bot Store folder.

Organize the Digital Worker or bot package folder under the Bot Store folder as shown in the following example:

Table 1. Sample Digital Worker or Bot Package Structure

Digital Worker Folder	Sub-folders
<Digital Worker or bot package name>	<p>My Tasks: Can contain only the .atmx file type.</p> <p>Store the Master Bot and all the other sub-tasks referred by the Master Bot in this sub-folder.</p>
	My Metabots: Can contain only the .mbot file type.
	Error Folder: Can contain all the file types except .atmx and .mbot files
	Input Folder: Can contain all the file types except .atmx and .mbot files

Note: A 'Readme.pdf' must be included in the root folder of the zip file.

Store the MetaBots in the My MetaBots folder. Call the MetaBot within a task under any of the Digital Worker or bot package folders.

Ensure that you add the bot dependencies only from the Bot Store folder or any of its sub-folders under the parent My Tasks folder.

Note: You cannot add the .mbot file to the My Tasks folder. It must be stored in the My Metabots folder.

See [Digital Worker packaging](#).

Related concepts

[Bot Store integration overview](#)

[Digital Worker packaging](#)

[Automation Anywhere Digital Worker overview](#)

Related reference

[Uploading and Downloading Tasks to the Server](#)

## Viewing and playing protected bots

The code of a protected bot downloaded from the Bot Store cannot be copied and redistributed by others. Automation Anywhere supports protection of the Intellectual Property (IP) rights of the original creator of the Digital Worker or bot, by ensuring the bot code is not exposed.

### Viewing protected bots

You can identify protected bots from the Protection Type column of the Task List in the Enterprise client main window. The Protected and Unprotected values are shown for the TaskBots in the My Tasks sub-folder under the Bot Store folder. For files in all other folders, the value is shown as N.A.

The upload and download dependencies table also includes the Protection Type column for identification of protected bots. However, this column is shown only for bots located within the Bot Store folder.

By default, the Protection Type column is hidden in the Task List. To include the column in the Task List, see [Customizing the Task List](#).

Ensure you are aware of the following considerations related to a protected bot:

- You can not view, add, edit, copy, paste, or delete the commands of the protected bot and the commands list is not shown in the Actions List of the Workbench.
- The Record, Filters, Search text, Actions, Enable Debugging, and Set SnapPoints options in the Workbench are not available for a protected bot.
- The variables are visible in the Variable Manager and you can:
  - View the variable and change the variable values.
  - Copy the variables from the protected bot and paste it in another bot that is not protected.
  - Tag a variable for analytics.

However, you cannot:

- Add any new variables or edit existing variable attributes using Add and Edit options.
- Paste variables in the protected bot that are copied from another TaskBot.
- Delete any existing variables using the Delete option.

The Queue Category link in the Variable Manager is disabled.

- The Bot Dependencies of the protected bot are visible. However, you cannot add, edit or delete any of the bot dependencies.
- The Edit, Debug, File -> Save As, Tools -> Run from Step, and Tools -> Disable Snap Image View menu options are disabled.

You cannot save the protected bot as an XML file from the command line.

- The Visualize tab does not display snappoints or images captured during recording. Instead the following message is shown:

You cannot set SnapPoints or visualize the images of this bot as it is protected however you can view or edit the variables value and/or view the bot dependencies only.

- The Error View does not show the actions when the protected bot uses the Error Handling command.

You cannot view a protected bot in a previous version of the Enterprise client. An error message is shown indicating that the task file format is invalid.

## Playing protected bots

When a Bot Creator or Bot Runner executes a protected bot, the player window of the Enterprise client does not show the command information nor is the information sent to or stored in log files that are generated at run time.

- The command related information of a currently running bot is not shown on the player window, even when the bot is scheduled and deployed from the Enterprise Control Room.
- The player window displays the message 'Not available for Protected bot' against the Action for each command that is executed. This message is displayed for a protected child bot, even when the parent bot is not a protected one.

However, if a protected bot encounters an error, the error message that is shown includes the command line number and the command information of the protected bot. The email notification contains error description and command information.

Related tasks

[Debugging TaskBot](#)

Related reference

[Saving a TaskBot](#)

[Uploading and Downloading Tasks to the Server](#)

[Using the Variable Manager](#)

[Enabling the Debugging Option](#)

[Tour of the Workbench](#)

[Customizing the Task List](#)

Related information

[Using SnapPoint](#)

## Creating a bot package

Enhance your experience to seamlessly create a zip package of a bot or Digital Worker with the dependencies from the Automation Anywhere Enterprise client, and then submit it to the Bot Store when you want to publish the bots or Digital Worker for the end users.

### Prerequisites

Ensure that the [Master Bot](#) file of the [Digital Worker](#) or the bot that requires to be packaged is stored in the Bot Store > <Digital Worker> > My Tasks folder. See [Organizing Bot Store Digital Workers and bots](#).

To create a zip package, do the following:

## Procedure

1. Navigate to the Tasks > Bot Store > <Digital Worker> > My Tasks subfolder.

2. Right-click the Master Bot file (.atmx file) and select Create Zip .

You can also select Create Zip from the Actions menu. See [Working with tasks](#).

- If the selected task has no dependency, the Save As dialog box appears. Go to Step 4.
- If the selected task has dependencies, the Create Zip dialog box appears showing all the dependent MetaBot and Task files of the selected Master Bot file.

Note: If the selected task has invalid dependencies, the exceptions are shown in the Remarks column. You must resolve these dependencies to successfully create a zip file.

3. Click Create Zip.

The Save As dialog box appears.

4. Specify a location to save the zip file.

Note: By default the filename of the zipped file is the same as the Digital Worker. You can also change it as required.

5. Click Open to access the zip file.

The zip file contains a manifest file, a Readme file(.pdf) and the three folders: Input Folder, Error Folder, and My MetaBot that are automatically created if they do not already exist. See [Digital Worker packaging](#).

## Next steps

After successfully creating the zip package, you can now submit it to the Bot Store using the Bot Submission form available in the Bot Store. See [Posting to the Bot Store](#).

Related concepts

[Checklist for Bot Store submissions](#)

## MetaBot Overview

MetaBots are highly reusable, create it once, and use it everywhere bots. MetaBots can be shared across an enterprise or uploaded to the Bot Store to make it available to the entire Automation Anywhere community.

Users with the correct combination of roles, permissions, and licensing can create, save, and share MetaBots. As both creators and consumers, bot developers create MetaBots for reuse by other bot developers within an enterprise or share MetaBots across the entire Automation Anywhere community by uploading MetaBots to the [Bot Store](#).

## Why use MetaBots?

- Create independent, highly reusable automation blueprints of applications, DLLs, and commands facilitated by automation Logic.
- Leverage the MetaBot library to rapidly standardize org-wide automation.
- Ensure systematic, accelerated automation return on investment (ROI).
- Eliminate common navigational errors in complex automation tasks.
- Automate without requiring access to live application.
- Calibrate newer versions of applications used in a MetaBot to ensure compatibility.

## What you need to know about assets and Logic used in MetaBots.

Bot developers capture and save assets then develop navigational logic to produce reusable MetaBots.

### Assets

Application screens and DLLs make up the Assets bot developers use to define and pre-configure for the use case of a target application. Read more about [MetaBot assets here](#).

### Logic

Logic is the navigational work-flow wrapped around components, commands, functions, and DLLs within a TaskBot or MetaBot. Logic is created, edited, and saved from the Workbench. Read more about [MetaBot Logic here](#).

### Related concepts

[Additional features and functions in MetaBot Designer](#)

[Build a basic MetaBot to automate input to a web page using the Enterprise client](#)

### Related reference

[Understand the MetaBot Designer](#)

[Work with MetaBot Designer using the Enterprise client](#)

[Enterprise client prerequisites](#)

### Related information

[Upload considerations for MetaBots](#)

## Understand the MetaBot Designer

Well designed MetaBots are key to efficient and reliable reuse of all the Master Bot components and functionality.

## MetaBot Designer features

- Specify folders in an existing MetaBot,
- Add DLL's to create low level operations of an application by circumventing GUI
- Create simple independent yet functional Logic blocks.
- Also, create MetaBots and upload them to Enterprise Control Room to create a repository for using/reusing MetaBots in automation tasks.

## MetaBot Designer Decoded

The work space in the MetaBot Designer allows you to work with multiple MetaBots at the same time. Keep MetaBots open in the form of tabs to simultaneously work on different MetaBots.

Once you create a MetaBot, you are taken to Assets tab by default where in you can start by adding new assets (Screens/DLLs).

## Understanding Assets

The following explains the options available within an Assets view:

### MetaBot Tab

The MetaBot opens in its own tab. This tab is dedicated to the Assets and Logic for that particular MetaBot.

**Assets Tab**

When highlighted it indicates that the view is open in 'Assets'; it displays all the Screens, DLLs and Folders inherent to this particular MetaBot. It is selected by default for a new MetaBot.

**Add Folders\***

You can organize your MetaBot using 'Folders'. This will enable you to easily manage all your screens and DLLs that are to be uploaded/have been uploaded.

**Add Screen\***

Use this feature to capture a single screen for an application. Start the application screen you are adding before using this feature. Also, if the application is closed, you will be prompted to open the required application.

Note: MetaBot Logic has been updated to refer to the Screen Title value to identify applications. Command titles are no longer used. Existing Logic that refers to command titles needs to be updated to use the Screen Title value.

To know more about adding a screen to MetaBot using OCR, see [Add a Screen using OCR](#).

**Record Screen**

When you need to capture multiple screens of the related application/web page at one go, use Record Screen.

Tip:

- Use Record Screen to record all the Screens/UI elements (Menu item / Popup / context menu etc.) as you interact with the application in a work flow mode. These UI elements cannot be captured using Add Screen.
- If an application has multiple exe's, you are required to create a separate MetaBot for each.

**Add DLL**

If you need to use an 'Application Programming Interface' (DLL) within your MetaBot, you can add it to the MetaBot using 'Add DLL'. Remember though, you cannot include special characters in DLL names, see [Workbench and creating Logic](#)

Note: The Screens, DLLs and Folders are displayed in the order they were added.

**Configure**

Use this to edit properties for the recorded/added screen. Here you can provide aliases such as a 'Screen Name' and a 'Screen Title'. You can also select an object to define its properties such as Name, Path, Value, ID, Class, Index, States etc and the 'Play Mode' to be used when running tasks. Some of these properties help to uniquely identify an object during playback. You can thus use configure to improve the reliability of your automation, see [Object properties configuration](#)

**Calibrate**

Applications are continuously updated with improvements and newer features, your captured screen and its object properties often need a re-look after every update of the application. In the MetaBot Designer you can use Calibrate to instantly compare an existing screen with a newer screen to identify changes. For more details, see [Calibrate screens](#).

**Upload**

The MetaBots can be uploaded to the Enterprise Control Room, which acts as the central library from where fellow MetaBot Designers can pick up the MetaBots necessary to their task(s). With MetaBot privileges you can upload and deploy the MetaBots to the server, see [Upload considerations for MetaBots](#).

**Delete**

Use this to delete MetaBots that are no longer required.

Note: Deleting a MetaBot from the MetaBot Designer does not delete it from Enterprise Control Room.

\* If your Screens are set at lower resolutions; for example 1024 X 768, the 'Add Folder' and 'Add Screen' options can be accessed from the 'Edit' menu.

## Understanding Logic

Once you have captured the desired assets, move on to create Logic using those assets.

A Logic is an independent yet functional unit of a process that represents a part navigational flow of an application and can be integrated into automation tasks as and when required.

You can use Assets (Screens and DLL's) to design a Logic block. Subsequently, you can upload the Logic to Enterprise Control Room. Logic Blocks can be shared with and reused by other bots with appropriate MetaBot privileges.

The following explains the options available within a Logic view:

### MetaBot Tab

The MetaBot opens in its own tab. This tab is dedicated to the Assets and Logic for that particular MetaBot.

### Logic Tab

When highlighted it indicates that the view is open in 'Logic'; it displays all the Logic Blocks and Folders inherent to this particular MetaBot.

### Add Folder

Similar to Assets; for instance, you can add Logic Blocks that are functionally similar to a folder.

### Add Logic

Use this to create your navigational flows in the Logic Editor, see [Workbench and creating Logic](#).

### Record Logic

Use this to record the logic flow and automatically save Screens in Assets, see [Record Logic](#).

### Edit

Use this to edit an existing navigational flow.

### Upload

Use this to publish (upload) your (new or edited) Logic to the Enterprise Control Room, see [Upload considerations for MetaBots](#).

### Delete

Use this to delete obsolete Logic.

Note: The Logic and Folders are displayed in the order they were added.

- [Add a Screen using OCR](#)

You can add a screen to a MetaBot using an OCR engine.

## Add a Screen using OCR

You can add a screen to a MetaBot using an OCR engine.

To add a screen in the MetaBot using OCR, do the following steps:

## Procedure

1. Click Add Screen in the MetaBot Designer.

The Open Screens window appears.

Tip: If Add Screen is not visible, expand the MetaBot Designer window.

## 2. Select OCR for the capture type.

This option allows you to capture objects from the application images that are exposed over applications such as Citrix or RDP. When capturing screens with OCR, ensure that the screen DPI is set to Standard or 100%.

The OCR engines available for selection are: ABBYY, MODI, TESSERACT and TOCR. See [OCR Command](#).

**11.3.2** ABBYY is the default OCR engine for Enterprise client Version 11.3.2. See [Configuring ABBYY for Automation Anywhere](#).

Note: These options are available only when you create a screen and not when you record a screen.

## 3. Click the screen to add.

A thumbnail of the screen is visible when it is added as an asset.

## Next steps

All the MetaBots require logic to enable its assets to work. [Create Logic for a MetaBot](#) is the next step in the parent task [Create a basic MetaBot](#).

## Work with MetaBot Designer using the Enterprise client

The MetaBot Designer is included with the Enterprise client. An Automation Anywhere administrator configures that appropriate licenses and packaging to enable the Master Bot Designer.

Access the MetaBot Designer from the Enterprise client.

## Launching the MetaBot Designer

After successful installation of Enterprise client setup, the feature is added to the product under the Automate Tab.

Click on 'MetaBots' to launch the MetaBot Designer.

## Understanding MetaBot Designer in the Enterprise client

### [Understand the MetaBot Designer](#)

You can access the features illustrated below in MetaBot Designer:

- New - Use this to create a New MetaBot. The MetaBot thus created does not include any Assets or Logic; its empty. You can start with either - 'Record Screen', 'Add Screen' or even 'Add DLL' based on the purpose for which the MetaBot needs to be created.

Tip: The MetaBots are saved to the application path in the 'My MetaBots' folder.

- Record - Record is an alternate method of creating a MetaBot. Here, at-least one MetaBot will be present as its recorded.
- My MetaBots – This tab is shown by default; it displays all MetaBots. This tab is always open, by default.

Note: Each selected MetaBot opens in its own tab:

- Configure - Use this to edit your application properties for the recorded/added screen.

### [Object properties configuration](#)

- Calibrate - Use this to instantly compare an existing screen with a newer screen to identify changes if any.

### [Calibrate screens](#)

- Upload - Use this to upload the MetaBots to the Enterprise Control Room for download by other MetaBot users.

### [Upload considerations for MetaBots](#)

- Delete - Use this to delete MetaBots, Screens and DLLs.
- Export/Import - Use this to export and import MetaBots for use in different Enterprise Control Room setups.

## Additional features and functions in MetaBot Designer

The MetaBot Designer provides bot developers several unique features and functions for creating MetaBots.

- [Object properties configuration](#)

MetaBot creation often starts when a bot developer records the screen included in an automation task. bot developers need to identify and handle as many task process scenarios as possible.

- [Calibrate screens](#)

An application can undergo continual change during its life-cycle with improvements and newer features. MetaBot Designer's Calibration feature allows comparison of existing screens with newer screens, identifying any changes.

- [Folders and MetaBots](#)

Bundle similar screens and DLLs together using folders. This helps to logically manage MetaBots for ease of understanding and use.

- [Workbench and creating Logic](#)

As a user with AA\_MetaBot Designer access privileges, use the Automation Anywhere Workbench to create simple manageable independent navigational flows that can be integrated into other automation TaskBots or MetaBots Logic.

- [Record Logic](#)

Related concepts

[Build a simple MetaBot with one DLL](#)

[Build advanced bots with the Enterprise client](#)

Related tasks

[Create a basic MetaBot](#)

## Object properties configuration

MetaBot creation often starts when a bot developer records the screen included in an automation task. bot developers need to identify and handle as many task process scenarios as possible.

Object properties help to uniquely identify the associated object during playback. A significant part of object configuration is done automatically. However, for complex cases, bot developers can adjust object properties to improve MetaBots reliability.

## Configure a screen object

Select an existing screen and use Configure to edit its properties.

- Provide aliases such as a Screen Name and a Screen Title
- Properties such as Name, Path, Value, ID, Class, and Index can be modified and saved.

Select an object to define, States and the Play Mode to be used when running tasks.

- Provide a Screen Name.

Note: Screen Name is the one that we provide to the added screen, while Screen Title is the one that appears on the screen window that is configured.

- Rename the screen if it would be easier for a user to identify with something else.
- It is recommended that generic screen title are used to ensure compatibility with all situations.

**Tip:** Use '\*' to add a generic title.

- Screen Type Identifies the object capture type that was used.
  - Standard: For Standard captures, Technology is shown as UIAutomation.
  - OCR: OCR automation, the system displays the OCR engine used to capture the object.

## Configure object properties

Configure object properties using View, Selected Object Details, and Object Search Criteria.

- Rename the objects
- Select a play type
- Manually link one object with another
- Define the search criteria to be used when running the automation

## Object types

- Custom Objects: Are defined when the object properties are not captured while recording or capturing a screen.

Select an area to define it as a custom object. Custom objects include:

- Push Buttons
- Text Boxes
- Static Text
- Links
- Images

**Tip:**

- All custom objects are highlighted with a blue outline when selected and non-custom objects are highlighted in red outline. Object outlines are visible on mouse-over also.
- Anytime objects are moved or are re-sized, update relevant Screen(s) to reflect the change.

- Linked Objects: Are linked to other objects or UI elements that can be searched easily during automation execution.

For objects that are captured using OCR, the linking is done automatically. However, for screens that are captured using Standard technology must be linked manually. Read more about MetaBot in the topic [Build advanced bots with the Enterprise client](#).

- Text Box Objects: Objects that appear as text-boxes in the captured screen.
- Static Text Objects: Objects that appear as text in the captured screen.
- Co-located Objects: Objects that are neighboring to the currently selected object belonging to the same parent control. Co-located objects are not visible in the View filter.
- Nameless Objects: Objects that have not been categorized in any of the other object types. These objects appear on the screen, but are not configured. Unique system generated names enable Nameless Objects to be identified during Screen and Import/Export Command configuration.

The Nameless objects captured before an upgrade to the 11.0 version continue to exist as Nameless. However, it is recommended that you assign names to those for easier identification in Import or Export automation.

## Customize object details

After configuring object properties, choose the Selected Object Details panel to customize an object for specific automation requirements. Set the following properties:

- Name: Specify user friendly, easily identifiable names for the objects.
- Play Type: Select Object, Image, Coordinate or Text. Play types are enabled automatically depending upon the selected object type. Change the Play Type if needed.
  - Object: Use this as the play type for object selected on the basis of its object properties. This could be useful when the selected objects are dynamic in nature; in the sense that they keep shifting their positions in the target application. This is considered the most reliable form of automation as it is performed on the UI based elements of the object.
  - Tip: If object based automation execution is not possible, use one of the other play modes Image, Coordinate, or Text.
  - Image: Use this as the play type for objects selected on the basis of its image properties. This could be useful when object based automation is not feasible or fails for certain reasons. For example, image based automation works for Citrix, RDP, and Legacy applications such as delphi.

You can also use this option when you want to run automation to extract text from screens that were captured using OCR. [Actions in the Workbench](#)

- Coordinate: Use this as the play type for objects selected on the basis of its coordinates properties. This could be useful when selected object is available at the same co-ordinates in the target application.
- Text: Use this as the play type for objects selected on the basis of its text properties. This could be useful when you want to extract text from an image based object in the target application. Since the text is extracted using OCR engine while configuring screens, only that OCR engine is used to execute the automation. Hence, the selected OCR engine should also be installed on the Bot Runner machines to ensure your automation do not fail.
- Note: In case the object is not located using OCR Occurrence, the system automatically searches using Image Occurrence.
- Object Properties:

Select Properties type that you wish to use during play time from Object Search Criteria. You can choose to view select properties or view them all. Some properties are selected by default.

Note: Objects that are not linked manually to other objects, its own search properties are used whereas for objects that are linked to other objects using the Link option, the selected object will be searched based on search properties of the linked object during automation execution.

You can also change the Values of the properties, if required to make your MetaBots more reliable.

Note: Properties could differ depending upon the type of object/control captured. For example, for objects captured using OCR, the object properties show the number of times an object appears in the screen. You can also choose to update the occurrence manually.

## Calibrate screens

An application can undergo continual change during its life-cycle with improvements and newer features. MetaBot Designer's Calibration feature allows comparison of existing screens with newer screens, identifying any changes.

Tip: Calibration of web-apps and web pages must be done in the same browser type in which it was recorded.

## Folders and MetaBots

Bundle similar screens and DLLs together using folders. This helps to logically manage MetaBots for ease of understanding and use.

MetaBots can have any number of folders. Perform operations on a folder, such as configuration, calibration, uploading and deletion.

Assets and Logic can be moved within Folders of a MetaBot.

## Workbench and creating Logic

As a user with AA\_MetaBot Designer access privileges, use the Automation Anywhere Workbench to create simple manageable independent navigational flows that can be integrated into other automation TaskBots or MetaBots Logic.

Logic is a pre-configured use case of an application that leverages screens, commands, and DLLs to manage the automated work flow in bots.

## Workbench and Logic

Here are some of the components of the Workbench.

- New: Use this to create a new MetaBot Logic
- Record: Select and open the Smart Recorder, Screen Recorder, or Web Recorder.
- Run: Run the Logic in edit mode of the Workbench.

- Save: Save a new or an edited Logic  
Note: 'Run', 'Save' and 'Edit' are enabled when an Action/Command is configured.
- Error View Manage errors that occur in the bot Logic. Use the Error Handling command to manage those.
- Variable Manager: Add and edit variables in the Logic. Read more about variable here [Adding, Editing and Deleting Variables](#)

## Record Logic

Bot developers can capture the work flow directly instead of creating screens, configuring them, and then manually designing the Logic. Record Logic for an existing MetaBot to enable direct capture of work flow with screens.

To record Logic for an existing MetaBot, use Record Logic from Logic section of the MetaBot Designer.

To record Logic for a new MetaBot, use the Record Screen(s) with Logic option in Record from the MetaBot Designer panel.

Note: MetaBot Logic has been updated to refer to the Screen Title value to identify applications. Command titles are no longer used. Existing Logic that refers to command titles needs to be updated to use the Screen Title value.

## Actions in the Workbench

Select various Actions in the Workbench based upon the object and control type selected. Actions are allowed on HTML, .NET and Java Swing/AWT controls.

### Actions allowed on HTML controls

The following Actions are allowed on HTML Controls:

- Click
- DoubleClick
- RightClick
- SetText
- AppendText
- GetProperty
- GetVisibility
- GetTotalItems
- GetSelectedIndex
- GetSelectedText
- SelectItemByText
- SelectItembyIndex
- GetChildrenName
- GetChildrenValue

## Get Text, SetText and AppendText

GetText, SetText and AppendText actions are available when the selected object types are Text/Text Box, Password, Windows Control , or Custom Objects.

The properties and relevant actions in the Logic are controlled by the [Object properties configuration](#) set for the selected Screen.

## GetProperty

Use the 'Get Property' action when you want to search the objects based on their properties during play time.

When you select action as 'Get Property', you will be able to select properties names such as Object ID, Name, Value, Class, Type, Index, Description, State, IsVisible, IsProtected etc based on the object control selected.

 Tip: Use the 'IsVisible' property to identify whether a specific object is visible or not. For custom objects, you can achieve this by using the 'GetVisibility' action; refer the next section.

## Get Visibility

Use the GetVisibility action to build a logic based on an object's visibility during play time. This screen area could be a custom object or an object with Play Type Image. The 'GetVisibility' action returns the visibility status as True or False.

To add a 'GetVisibility' action in the Logic Editor, the object should be configured for Play Type 'Image'.

Tip: GetVisibility can be combined with conditional commands such as If.

## Actions allowed on Window Controls

The following Actions are allowed on Window Controls:

- Click
- DoubleClick
- RightClick
- LeftClick
- SetText
- AppendText
- GetProperty
- GetChildrenName
- GetChildrenValue

SetText for Window Control: Use the action type 'SetText' for Window Controls. Select the entire window and specify the action type.

Note: The Window Control for Play Type 'Object' uses keystrokes by default.

## OCR screens

For screens that are captured using OCR technology, when you select play type as Image for custom objects, you are allowed actions - SetText, GetText, LeftClick, RightClick, DoubleClick, and GetVisibility.

- GetText: When you select GetText for play type Image for a custom object, you can choose an OCR engine to extract text while creating a MetaBot Logic. You can choose an OCR engine other than the one selected during screen configuration for optimizing your automation.

Note: 11.3.2 ABBYY is the default OCR engine for Enterprise client Version 11.3.2.

## Upload considerations for MetaBots

Upload MetaBots to the Enterprise Control Room from where other bot developers can download and use them.

Note: The Upload and Download features require logging in to the Enterprise Control Room.

## Providing Folder Access Rights in Enterprise Control Room

The Enterprise Control Room administrator can provide appropriate rights to bot developers to Upload, Download and/or Delete the MetaBots from the Bots tab while creating a role in Administration module of the Enterprise Control Room. [Learn More](#)

Note: All the users will be able to upload and download from the My MetaBots directory in the Enterprise Control Room.

## Accessing My MetaBots Folders

The Enterprise Control Room administrator can access the MetaBots uploaded in the Bot > My MetaBot repository. [Learn More](#)

## Metabot Variables

Refer to each variable below for more information.

- [Adding, Editing and Deleting Variables](#)

Variables are storage locations for known or unknown information. When creating Logic, variables play an important role in maintaining or calculating information. Variables can help you in a number of ways, from fetching online data to transferring data between applications.

- [System Variables](#)

Automation Anywhere provides powerful pre-defined system variables that you can use to design Logic Blocks.

- [Variables - Parameter Types](#)

Since MetaBot Logics can be used in other TaskBots / Logics (of the same MetaBot), you might want to pass on certain variable parameters to another TaskBot / MetaBot Logic when executing a Bot.

- [Passing parameters from and to MetaBot Logic](#)

As an Automation Expert, when you are creating automation that comprise a combination of TaskBots

and MetaBot Logics, you would want to pass its parameter values from one to another for smooth functioning of your automation.

## Adding, Editing and Deleting Variables

Variables are storage locations for known or unknown information. When creating Logic, variables play an important role in maintaining or calculating information. Variables can help you in a number of ways, from fetching online data to transferring data between applications.

Automation Anywhere allows you to use various types of variables - locally defined or system defined in a MetaBot Logic. The following section describes how to add, edit and delete locally created variables.

### Adding Variables to a MetaBot Logic

You can use the F2 function key to list all user and system variables that are available for insertion in a MetaBot Logic.

#### User defined variable types

You can create four types of variables that can be used in a MetaBot Logic - Value, List, Array, and Random.

1. Value - You can use a value type variable when you need to hold a single data point and use it in multiple places. This "placeholder" value can represent either text or numeric data.

After you create the variable, you can use it by inserting the variable in several of the Logic Editor commands. When the value of the variable is modified, this value is reflected in any subsequent commands.

You can also mark a value type variable as 'Regular Expression'. These, you can use when creating TaskBots /MetaBot Logics that require pattern based searches in files, folders and window title commands.

2. List - You can use a list type variable when you need to retrieve multiple values, one by one. It is basically one dimensional placeholder for data.

Common uses of list variables include:

- Sending email to multiple recipients
- Passing different values inside of a loop
- Searching multiple web addresses

The values can represent either text or numeric data.

3. Array - Use an Array type variable for creating staging areas for data that need to be retrieved by your process as it runs. It is a two-dimensional variable that holds multiple values in a table of rows and columns.
4. Random - You can create two types of random variables: string and numerical. Random variables are useful when you need to generate a random, repetitive string or numerical set. The values are generated when you run the TaskBot / MetaBot Logic.

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Common uses of Random variables include:

- String: Generating test data as input for fields or forms
- Numerical: Generating ID numbers in batch

5. Password - Use a password type variable when you specifically need to hold the data as a "Password".  
This value is encrypted by default.

Note: The password variable type is deprecated from Automation Anywhere version 11.0. You shall not be able to create new password type variables. However, MetaBot Logic(s) that make use of such variables shall continue to run. You would not be able to update such Logic(s) without replacing password type variables with more secure Credential Vault variable(s).

## Parameter Types

Since MetaBot Logics can be used in TaskBots, you might want to pass on certain parameters to another TaskBot / Logic (of the same MetaBot) when executing a Bot. For this, you can use variables and define their parameter types. Defining the type of parameters ensures optimum use of variables across Bots.

In MetaBot Logic, you can define four types of parameters - None, Input, Output, and InputOutput.

Refer [Variables - Parameter Types](#) for details.

## Editing a Variable

You can edit and modify any local variable that you have created. In addition, you can edit the pre-defined variables.

**Edit Variable**

Variable Type : **Value** Parameter Type : **Input**

Name : **Val1**

Regular Expression

Select : **Value**  Log For Analytics

Value :

Description : (Optional) **This is a Value type variable with parameter type Input. This is used to input variable |**

182 Characters Remaining

Note : Description of the variable will be visible while passing parameters to this variable from a TaskBot.

**Save** **Cancel**

To edit a variable, follow these steps:

1. Select the variable you want to edit.
2. Click the Edit button or right-click on the variable and select Edit. The Edit Variable window is displayed.
3. Modify the variable fields as necessary. You can change the variable type, the name, description or the method of determining value.
4. Click Save.

## Adding or Editing Description

You can add and edit description to the Value, Array, and List type variables when the Parameter Type is Input, Output, and InputOutput. This is highly useful as it provides contextualized help without any clicks, while using MetaBot Utilities/Logics in TaskBots.

**Add Variable**

Select Action :

Select Variable From List     Create New Variable

Variable Type : **Value**    Parameter Type : **Input**

Name : **Input-Date**

Regular Expression

Select : **Value**     Log For Analytics

Value :

Description : (Optional) **This is a Value type variable with Parameter Type as Input. This is used to pass the ir**  
139 Characters Remaining

Note : Description of the variable will be visible while passing parameters to this variable from a TaskBot.

**Save**    **Cancel**

## Deleting a Variable

To delete a variable, use the Variable Manager.

For instance if you 'Copy All' variables to another Logic, you might need to delete several variables that are redundant in the new navigational flow.

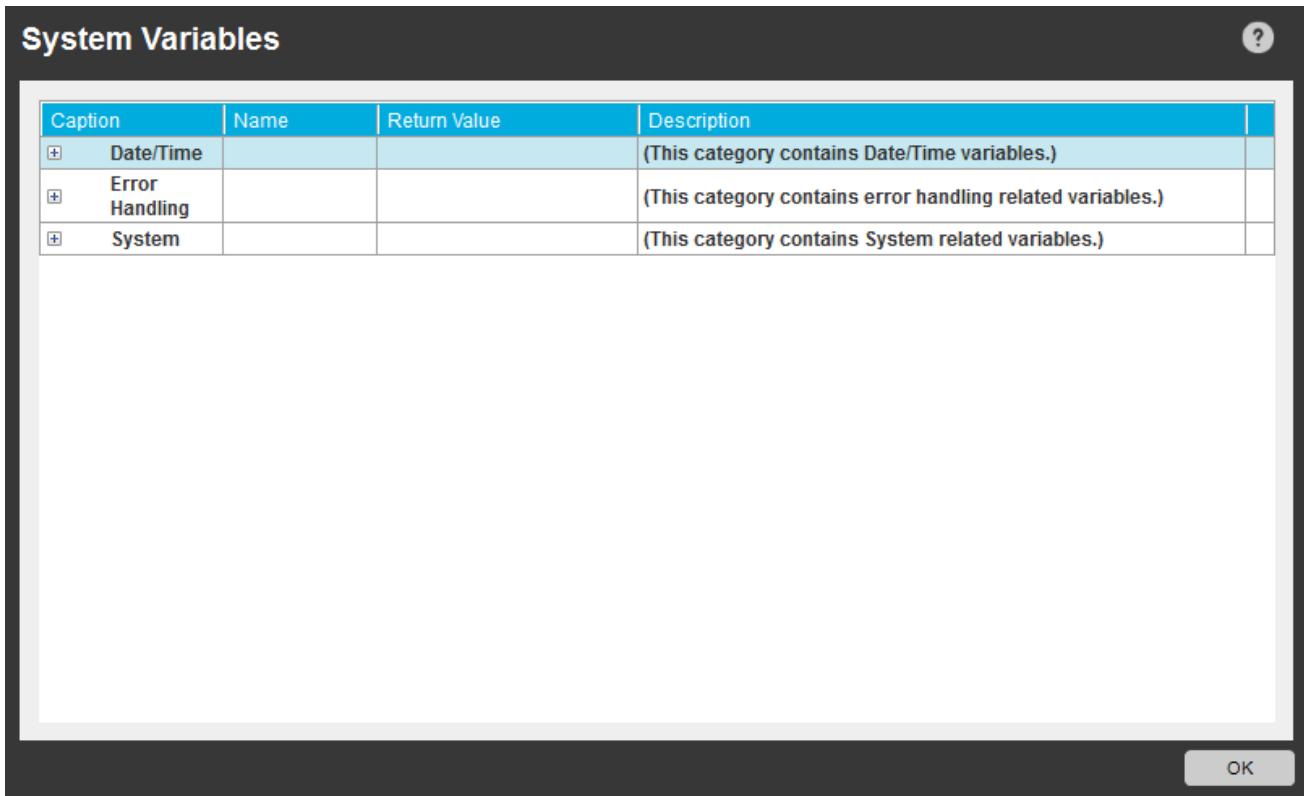
To delete a variable,

1. Select the variable you want to delete.
2. Click the Delete button or right-click on the variable and select Delete.
3. When the confirmation message is displayed, click yes.

Note: You can delete variables one at a time.

## System Variables

Automation Anywhere provides powerful pre-defined system variables that you can use to design Logic Blocks.



Note: Though similar, not to be confused with System Variables available in Task Editor.

System Variable types that can be used in the Logic Block include:

- Date/Time: System-related date and time variables.
- Error Handling: Error Handling related variables.
- System: Variables specific to a particular client machine.

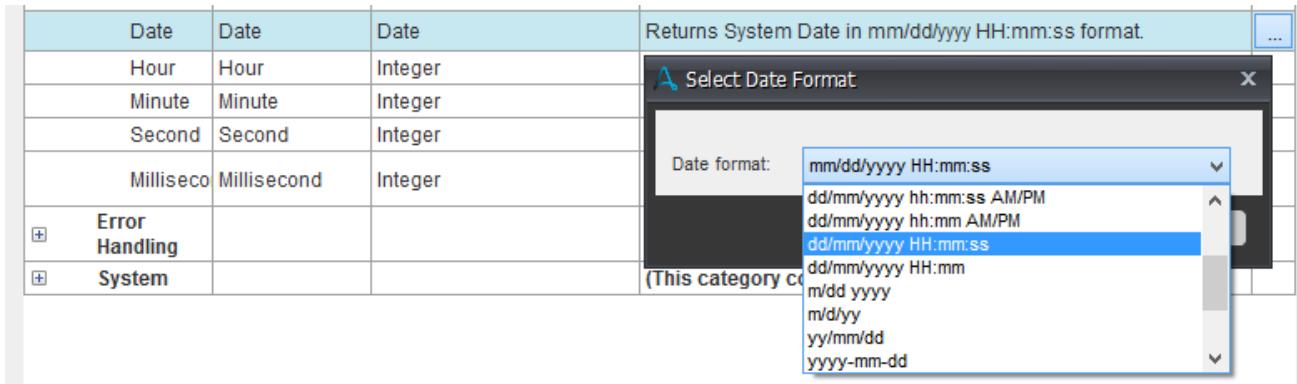
## Date/Time System Variables

Caption	Name	Return Value	Description
⊕ Date/Time	(This category contains Date/Time variables.)		
Year	Year	Integer	Returns Year. e.g. if date is 02/23/04, it returns 2004.
Month	Month	Integer	Returns System Month. e.g. if date is 02/23/04, it returns 2.
Day	Day	Integer	Returns System Day. e.g. if date is 02/23/04, it returns 23.
Date	Date	Date	Returns System Date in mm/dd/yyyy HH:mm:ss format.
Hour	Hour	Integer	Returns System Hour. e.g. if time is 17:33:49, it returns 17.
Minute	Minute	Integer	Returns System Minute. e.g. if time is 17:33:49, it returns 33.
Second	Second	Integer	Returns System Second. e.g. if time is 17:33:49, it returns 49.
Milliseco	Millisecond	Integer	Returns System Millisecond. e.g. if time is 17:33:49:10, it returns 10.
⊕ Error Handling			(This category contains error handling related variables.)
⊕ System			(This category contains System related variables.)

You can use the set of Date and Time system variables to insert or monitor the current date and time of a system as the navigational flow is implemented.

 Tip: You can change the date format for the System Date.

Click  to change the date format:



Date	Date	Date	Returns System Date in mm/dd/yyyy HH:mm:ss format.
Hour	Hour	Integer	
Minute	Minute	Integer	
Second	Second	Integer	
Milliseco	Millisecond	Integer	
⊕ Error Handling			(This category contains error handling related variables.)
⊕ System			(This category contains System related variables.)

## Error Handling Variables

Caption	Name	Return Value	Description
⊕ Date/Time	(This category contains Date/Time variables.)		
⊕ Error Handling	(This category contains error handling related variables.)		
Error Line Number	Error Line Number	Integer	Returns Automation Anywhere task error line number.
Error Description	Error Description	String	Returns Automation Anywhere task error line description.
⊕ System			(This category contains System related variables.)

Use the set of Error Handling system variables to return task error line number and description.

## System Type System Variables

Caption	Name	Return Value	Description
System	(This category contains System related variables.)		
Machine	Machine	String	Returns Machine Name.
Clipboard	Clipboard	String	Returns Clipboard text data.
System	System (Name)	String	Name = { "Path", "PATHEXT", "USERDOMAIN", "PROCESSOR_ARCHITECTURE", "ProgramW6432", "PUBLIC", "APPDATA", "windir", "LOCALAPPDATA", "CommonProgramW6432", "USERDNSDOMAIN", "TMP", "USERPROFILE", "ProgramFiles", "PROCESSOR_LEVEL", "FP_NO_HOST_CHECK", "HOMEPATH", "COMPUTERNAME", "PROCESSOR_ARCHITEW6432", "USERNAME", "NUMBER_OF_PROCESSORS", "PROCESSOR_IDENTIFIER", "SystemRoot", "ComSpec", "LOGONSERVER", "TEMP", "ProgramFiles(x86)", "CommonProgramFiles", "__COMPAT_LAYER", "USERDOMAIN_ROAMINGPROFILE", "PROCESSOR_REVISION", "CommonProgramFiles(x86)", "ALLUSERSPROFILE", "SystemDrive", "PSModulePath", "OS", "ProgramData", "HOMEDRIVE" }
AAApplicationPath	Application Path	String	Returns Product Application Path.
AAInstallationPath	Installation Path	String	Returns Product Installation Path.

You can use 'System' variables to include parameters in your automation task that are related to a particular computer. The variables return actual system settings and parameters, such as RAM, CPU/RAM usage, and total RAM.

**Common Use Case:** These variables are useful when the performance of a system needs to be tracked during an activity; for instance load testing.

The following table provides names, return values, and descriptions for the system-related system variables.

\*When you select the System variable, a menu is displayed from which you can select the specific system variable (see steps below).

### Steps to select System from Variables:

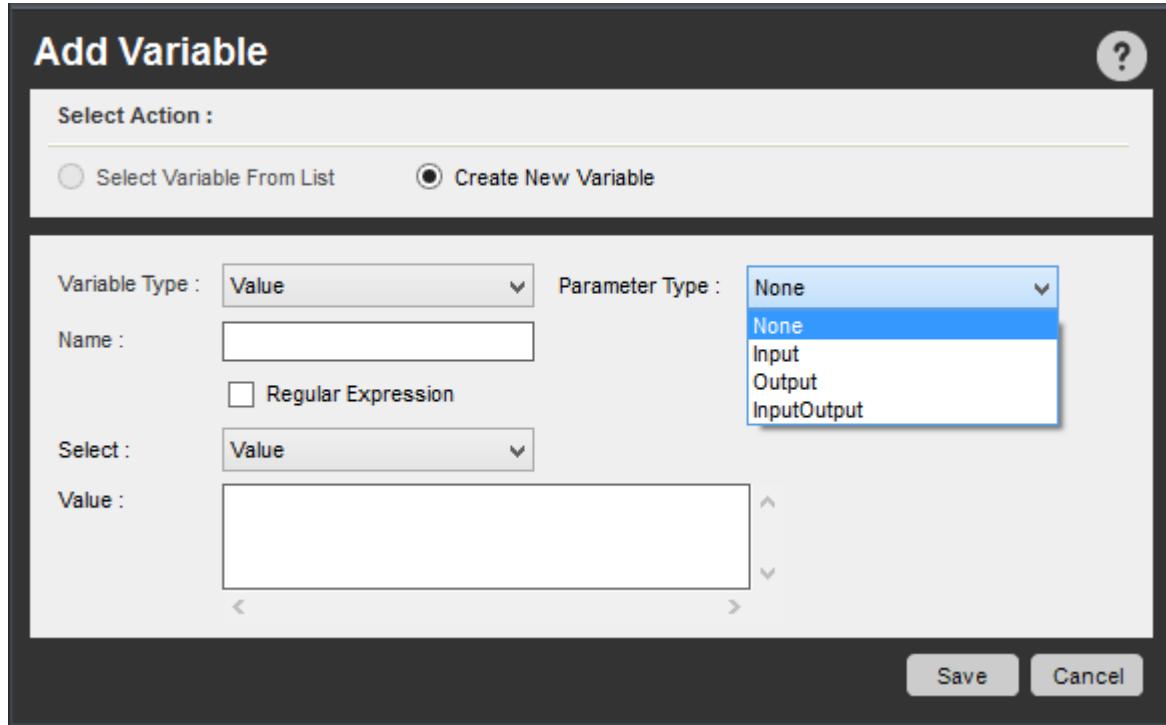
1. Click F2 and you will see Insert Variable window.
2. Select System and click Insert; a pop up window for System Variable Option appears.
3. Click OK and insert the System Variable.

## Variables - Parameter Types

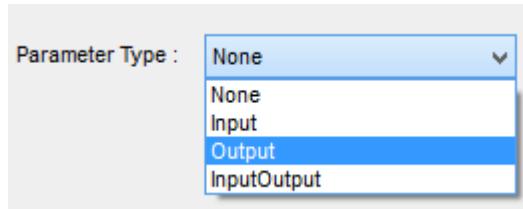
Since MetaBot Logics can be used in other TaskBots / Logics (of the same MetaBot), you might want to pass on certain variable parameters to another TaskBot / MetaBot Logic when executing a Bot.

For this, you can use variables and define their parameter types, which can then be added as Input or Output Parameters in an automation.

You can add and update parameter types from Variable Manager Add/Edit :



## Parameter Types



In MetaBot Logic, you can define four types of parameters for all variable types - None, Input, Output, and InputOutput

1. None - When you want to use the variable value only in the MetaBot Logic that it was created for, define the variable as None. You cannot pass the value of such variables to another TaskBot or MetaBot Logic. Its value can only be read during Logic execution.
2. Input - When you want the variable to accept values from TaskBot or MetaBot Logic of the same MetaBots, define the variable as Input Parameter Type. You can also assign any other value/variable as an Input Parameter in the automation.
3. Output - When you want to use the variable value as an output in the MetaBot Logic it was created for and pass on the value to other TaskBot or MetaBot Logic as an Output Parameter, define the variable as Output Parameter Type.
4. InputOutput - When you want to use the variable value as both input and output in the MetaBot Logic it was created for and pass on the value to other TaskBot or MetaBot Logic, define the variable as

InputOutput Parameter Type. You can assign a value/variable as an Input Parameter and a variable as an Output Parameter in the automation.

## Passing parameters from and to MetaBot Logic

As an Automation Expert, when you are creating automation that comprise a combination of TaskBots and MetaBot Logics, you would want to pass its parameter values from one to another for smooth functioning of your automation.

Automation Anywhere allows you to pass parameters from a Logic to other TaskBots, Logics, and Dll APIs. The reverse is also possible - you can pass parameters from TaskBots, Logics, and Dll APIs to Logics.

### What is 'Passing of Parameters'?

When you create MetaBot Logic, you want to ensure that it can be optimally used in various TaskBots and MetaBot Logics. To achieve this, you first have to create variables with different parameter types - None, Input, Output, and InputOutput.

Each variable, based on its parameter type, is then used as an input parameter or output parameter or both in a TaskBot/ MetaBot Logic.

When it is used as an input parameter, you can add values to the variable or assign another variable as its value.

When it is used as an output parameter, you can only assign variables as its value. This will be read during automation execution.

This is passing of parameters from and to MetaBot Logic.

Refer [Using MetaBot Logic in TaskBots and MetaBot Logics](#) to know how to use variables as parameters.

Refer [Variables - Parameter Types](#) for details on types of parameters.

Note: If you have upgraded from Automation Anywhere 10.x to the current version, refer the following sections on variable behavior while passing it as a parameter.

## Passing parameters from Logic to TaskBot and from TaskBot to Logic

The table below shows the variable behavior when it is passed as a parameter from Logic to TaskBot and vice versa:

Variable type in TaskBot (T1) / Logic (L1)	Variable type in TaskBot (T2) / Logic (L2)	Behavior
Value (V1)	Value (V2)	V1 overwrites V2
	List (L2)	V2 is converted to 1x1 list and is assigned V1's value
	Array (A2)	V2 is converted to 1x1 Array and is assigned V1's value

Variable type in TaskBot (T1) / Logic (L1)	Variable type in TaskBot (T2) / Logic (L2)	Behavior
Random (R1)	Value (V2)	V1 overwrites V2
	List (L2)	V2 is converted to 1x1 list and is assigned V1's value
	Array(A2)	V2 is converted to 1x1 Array and is assigned V1's value
List (L1)	Value (V2)	First index of the list is assigned when it is used outside of the loop. In loop, the value is assigned with reference to counter. If it is outside of the range, then first index is considered.
	List (L2)	V1 overwrites V2
	Array (A2)	V2 is converted to nx1 Array and is assigned V1's value
Array (A1)	Value (V2)	You have to input row and column of V1 and its value is assigned to V2
	List (L2)	You have to input the column of V1 and its value is assigned to V2
	Array (A2)	V1 overwrites V2

 Note: The target variable value is overwritten by source variable value. However target variable type remains unchanged.

## Passing parameters from Logic to API Dlls and from API Dlls to Logic

The table below shows the variable behavior when it is passed as a parameter from Logic to API Dlls and vice versa:

Variable type being passed from Logic	Variable type of DLL API	Behavior
Value (V1)	Value (V2)	V1 overwrites V2
	List (L2)	Not supported. Read-only cell
	Array (A2)	Not supported. Read-only cell
Random (R1)	Value (V2)	V1 overwrites V2
	List (L2)	Not supported. Read-only cell
	Array (A2)	Not supported. Read-only cell
List (L1)	Value (V2)	First index of the list is assigned when it is used outside of the loop. In loop, the value is assigned with reference to counter. If it is outside of the range, then first index is considered.

Variable type being passed from Logic	Variable type of DLL API	Behavior
	List (L2)	V1 overwrites V2
	Array (A2)	Not supported.
Array - A X B (A1)	Value (V2)	You have to input row and column of V1 and its value is assigned to V2
	List (L2)	You have to input the column of V1 and its value is assigned to V2
	Array (A2)	V1 overwrites V2 when V2 is A X B type. If V2 is one dimensional, you have to input the column.

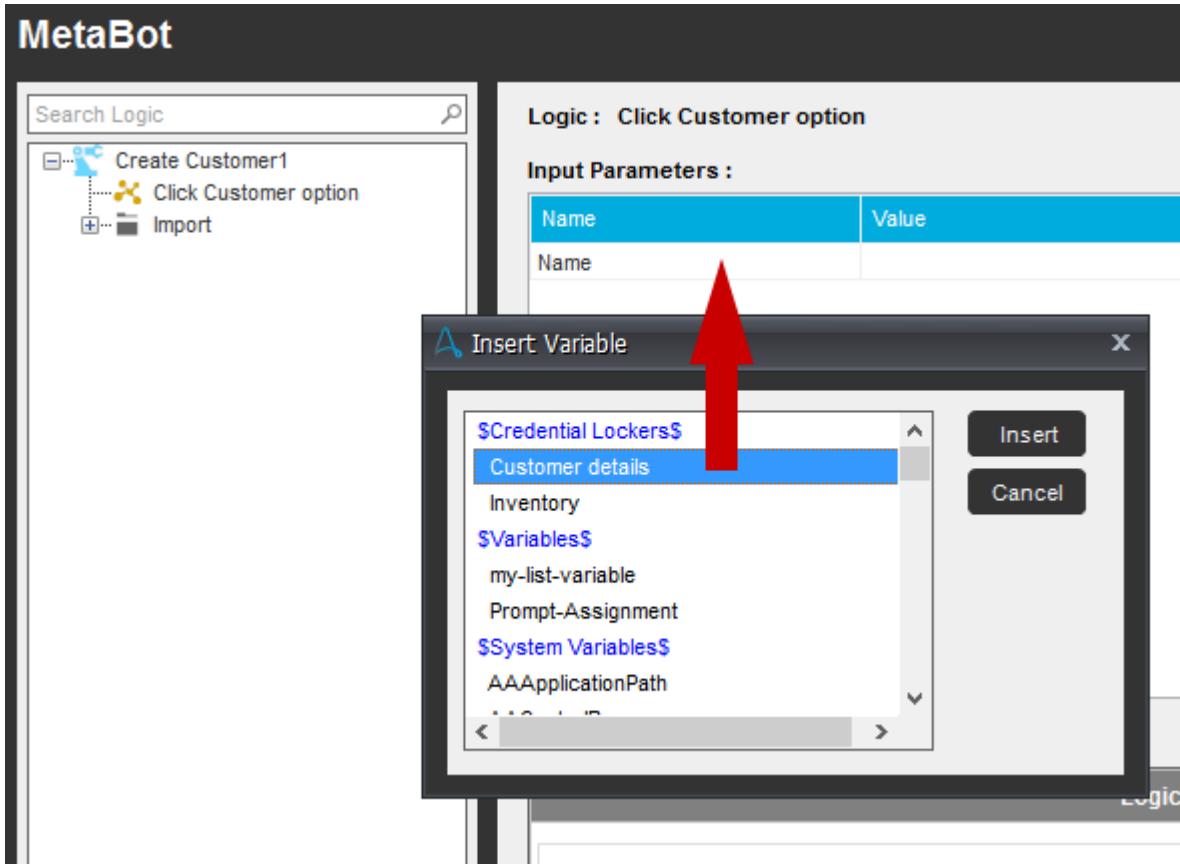
Note: You can assign output variables to value type variables only.

## Passing Credential Variables

To securely store sensitive information that is necessary to play automation, the Enterprise Control Room user with Locker Admin permission creates 'Credential Lockers' comprising 'Credential Names' and 'Attribute Names'. These credentials and attributes are used by Bot Creators (Client users who create tasks), from Credential Lockers in various commands that require credential inputs.

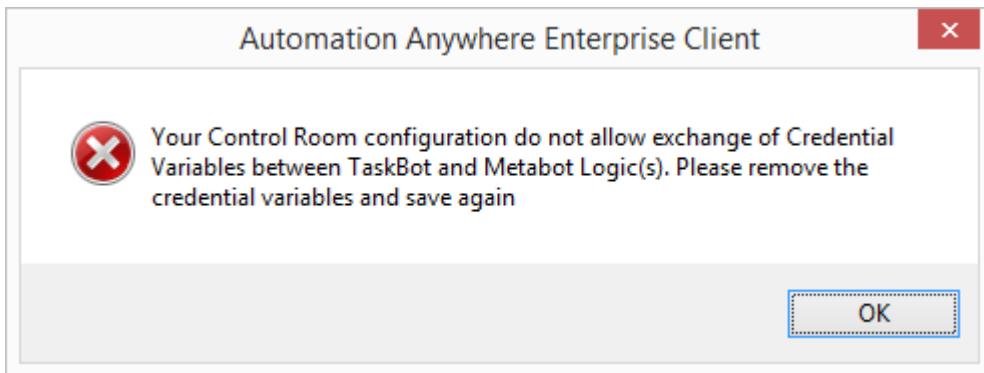
These special category of variables are centrally stored in a 'Credential Locker' to which the Enterprise Control Room user with Locker Admin will have exclusive access privileges.

While creating automation a Bot Creator, can pass the credential variables from a TaskBot to MetaBot Logic and from MetaBot Logic to another MetaBot Logic ONLY if the Enterprise Control Room administrator enables the setting passing of credential variables from one TaskBot /MetaBot Logic to another TaskBot / MetaBot Logic in the Enterprise Control Room.



Note: To access credential variables during automation creation and play, the Bot creator has to be online i.e. connected to the Enterprise Control Room.

If the setting is disabled once you have used the credential variables, upon saving the TaskBot /MetaBot Logic, the following message is shown:



## Metabot in Enterprise Control Room

Refer to each section below for more information.

- [Uploading MetaBots to Enterprise Control Room](#)

MetaBots can be uploaded to the Enterprise Control Room from where any number of Bot Creator Clients with MetaBot license can download and integrate them within automation tasks.

- [Creating Roles and Assigning Permissions for MetaBots](#)

You can define user roles and assign the necessary permissions for using MetaBots in the web based Enterprise Control Room from the Administration Roles page

## Uploading MetaBots to Enterprise Control Room

MetaBots can be uploaded to the Enterprise Control Room from where any number of Bot Creator Clients with MetaBot license can download and integrate them within automation tasks.

1. In the My MetaBots List, select (highlight) the MetaBot you want to upload.
2. Upload the MetaBot using one of the following methods:
  - In the Actions button, select Upload from the drop-down list.
  - Context click the MetaBot and select Upload.
  - Go to Repository in Manager, select the MetaBot, and click on Upload.

**Tip:** Ensure the MetaBot is closed in the MetaBots Client. Also, note that if the corresponding MetaBot is the only MetaBot that is opened in the MetaBots while uploading, you need to exit from the MetaBots Client.

## Uploading MetaBots when Version Control is Enabled

When Version Control is enabled, you can upload a MetaBot to the Enterprise Control Room repository with comments, after using the 'Edit' option.

1. In the 'My MetaBots' List, select (highlight) the MetaBot you want to Edit and Upload.
2. Edit the MetaBot using one of the following methods:
  - In the Actions button, select Upload from the drop-down list.
  - Right click the MetaBot and select Upload.
  - This launches the Upload Comment window:
  - Input your comments and click Save. This uploads the MetaBot to the Enterprise Control Room.

## Uploading Multiple MetaBots

1. Go to Manage > Repository.
2. Select the My MetaBots folder in the Client Repository list.
3. Select multiple MetaBots (use either ctrl or shift keys as required).
4. Click the Upload button.
5. In the Upload Files window, the MetaBots that are 'Allowed' to be uploaded are selected; if required, deselect the ones that you do not want to upload.

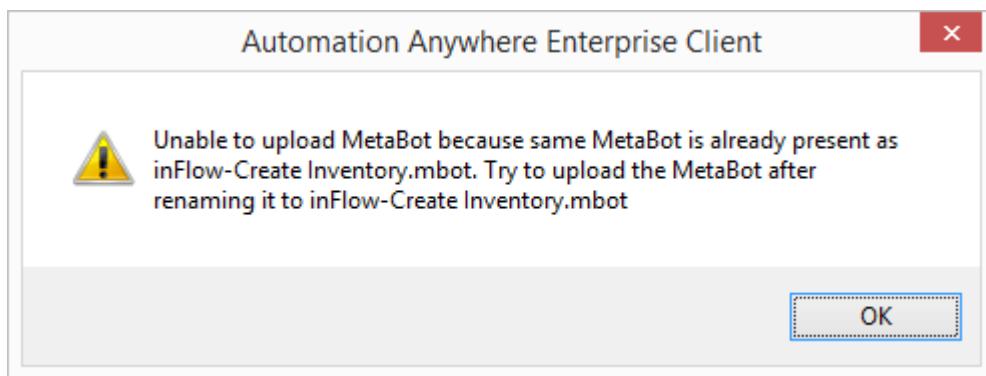
Tip: No prefixed icon/sign denotes a successful upload. This ensures that the version history can be used as a reference point by the Client.

Note: MetaBots marked 'Not Allowed' cannot be uploaded; the reason for which is depicted in the 'Remarks' column.

6. Add your 'Upload Comments' and click 'Upload'. These comments are applicable to all MetaBots that are uploaded.

## Uploading Renamed MetaBots

MetaBots that are already present in the Enterprise Control Room repository and are renamed from a file system cannot be reuploaded to the Enterprise Control Room repository. If you attempt to upload such a MetaBot from the Client, following message appears:



When you upload the renamed MetaBot(s) from the Repository, following messages appear:

- For a MetaBot:
- For multiple MetaBots:

You will have to revert to its original name in order to upload it.

## Creating Roles and Assigning Permissions for MetaBots

You can define user roles and assign the necessary permissions for using MetaBots in the web based Enterprise Control Room from the Administration Roles page

### Creating New Roles

 [Create role...](#)

To define new user roles, click

In the Create Role page, input the role name:

Select View my bots feature. This will enable the Bots panel below Features panel.

You can assign permissions based on the role you wish the user to play.

 Note: MetaBot users require a separate set of privileges to access the MetaBot files. Hence, the Control Room admin has to grant separate MetaBot Repository access rights at MetaBot file level, apart from the folder rights in Which Bots and supporting files? page.

## Access Permissions for MetaBot Users

To grant privileges such as Execute, Upload, Download, and Delete, click the MetaBots tab beside the TaskBots and Other Supporting Files tab in the Bots panel. Grant access privileges to a user at each MetaBot file level.

- Select All: User can use the MetaBot in TaskBot, to upload, download , and delete MetaBots.
- Execute: User can use the MetaBot in TaskBots but is not allowed to open the downloaded MetaBot in MetaBots Designer. This allows sharing of MetaBot as a Black-boxed bot. User cannot see/modify the content of a MetaBot.
- Upload: User can upload MetaBots.
- Download: User can download and modify MetaBots.
- Delete: User can delete the downloaded MetaBots.

Note: If you grant 'Download' permission to a user, the 'Execute' permission is automatically enabled so that a user can choose to either view or edit the content of a MetaBot that is downloaded.

Provide access rights based on the role that the user is allotted.

You can verify whether the User has been created in the Roles list page. [Learn More](#)

## Metabot in Enterprise client

Refer to each section below for more information.

- [AI-Sense Overview](#)

AI-Sense is a feature developed by Automation Anywhere that provides advanced capabilities and learning algorithms to make automation in all environments faster and more accurate. AI-Sense is bundled with Automation Anywhere Enterprise solution and does not require a separate installation, license, or purchase.

- [Renaming MetaBots](#)

- [Deleting MetaBots](#)

- [Enabling Version Control](#)

The MetaBot Designer has an integrated feature on Version Control that allows MetaBot users to manage various versions of MetaBots and enforce controlled edits.

- [Viewing Version History](#)

Use Version History to view the history of updates to the selected MetaBot. Also roll back updates, if required.

- [Using MetaBot Logic in TaskBots and MetaBot Logics](#)

As a Bot Creator you can integrate Logic in your TaskBots as well as other MetaBot Logics in the Automation Anywhere Workbench to create automation.

- [Add MetaBot Logic Properties](#)

When you create a MetaBot Logic it is easy to remember what end goal that particular automation achieves.

- [Debug Log for Autologon](#)

Enable debug logging for autologon.

## AI-Sense Overview

AI-Sense is a feature developed by Automation Anywhere that provides advanced capabilities and learning algorithms to make automation in all environments faster and more accurate. AI-Sense is bundled with Automation Anywhere Enterprise solution and does not require a separate installation, license, or purchase.

A bot can only use mouse clicks and keystrokes to automate a task in remote desktop environments, which restricts the bot to use only image-based, coordinate-based, and OCR-based automation commands. Below are some of the issues that affect the accuracy of an automation task in remote environments:

- Automation platform receives an image of the application and does not have access to the UI elements.
- Screen resolution and scaling may not be the same on the host and client machines.
- The position of a UI element may change for web applications on the screen of client machines.

AI-Sense provides intelligent image recognition through computer vision and AI techniques when automating a task on remote desktop environments. AI-Sense scans the application image and uses computer vision to identify the UI elements, and automatically creates all the UI objects from that image. These objects are available for automating a task through MetaBot Logic and help you save a considerable amount of time. AI-Sense is beneficial when automating tasks for:

- Applications that are available in a Citrix environment (XenDesktop and XenApp)
- Applications that are accessed over Remote Desktop Protocol (RDP)
- A legacy application such as Delphi

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.

The Export Dataset command in MetaBot enables you to extract a huge amount of data available in all the UI elements of an application. Similarly, the Import Dataset command enables you to insert a huge amount of data in all the UI elements of an application. You can use these commands for standard applications and remote applications. AI-Sense enables you to extract or insert data in all the objects visible on the screen in a single scan of the application and reduce the execution time considerably.

Related reference

[Export Dataset command](#)

[Import DataSet command](#)

[Object properties configuration](#)

Related information

[Workbench and creating Logic](#)

## Renaming MetaBots

To rename a MetaBot, follow these steps:

1. In the 'My MetaBots' List that is available in the Automate tab of the Client, select (highlight) the MetaBot you want to rename.
2. Rename the MetaBot using one of the following methods:
  - In the File menu, select Rename.

- In the Actions button, select Rename from the drop-down list.
- Right click the MetaBot and select Rename.

Tip: Ensure the MetaBot is closed in MetaBot Designer. Also, note that if the corresponding MetaBot is the only MetaBot that is opened in the MetaBot Designer while renaming, you need to exit from MetaBot Designer.

3. In the Rename File window, specify a name for the MetaBot.

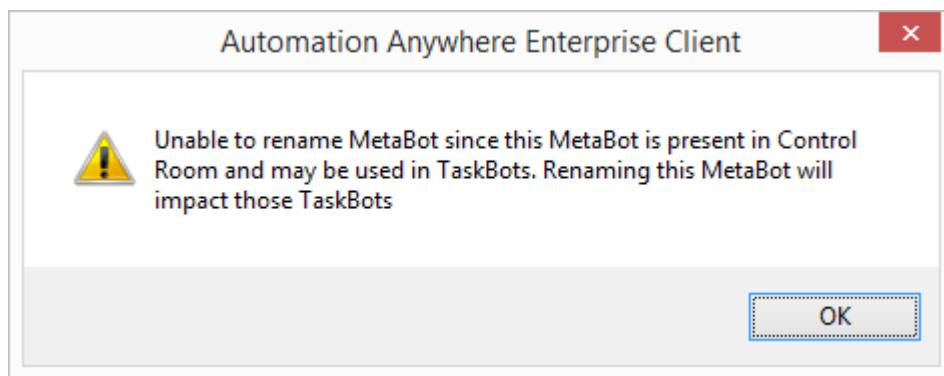
4. Click Save.

The renamed MetaBot is displayed in the My MetaBots List view.

## Renaming Existing MetaBots

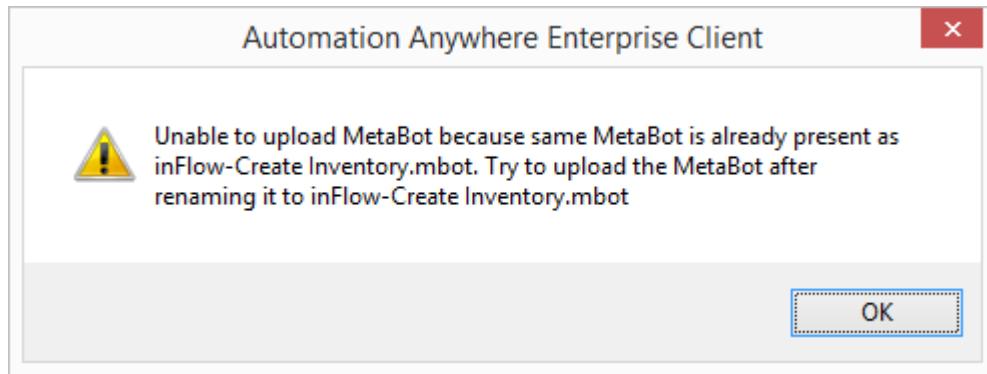
You can rename a MetaBot which is present only in your local machine and is not yet uploaded to Enterprise Control Room. If the MetaBot is present in Enterprise Control Room, system does not allow you to rename the MetaBot since it may be used in other TaskBots and renaming it may impact those TaskBots.

When you attempt to rename a MetaBot in the Client that already exists in the Enterprise Control Room, following message appears:



 Tip: It is recommended that you do not attempt to rename MetaBots from a file system.

MetaBots that are renamed from a file system cannot be uploaded again to the Enterprise Control Room repository. If you attempt to upload such a MetaBot from the Client, following message appears:



When you upload the renamed MetaBot(s) from the Repository, following messages appear:

- For a MetaBot:
- For multiple MetaBots:

You will have to revert to its original name in order to upload it.

## Renaming MetaBots if Version Control is enabled

You can rename a MetaBot in the local repository only. If the file is checked out for edit, you will be prompted a message as only the local MetaBot version will be renamed :

- If you try to upload a MetaBot that was renamed from a file system, you are shown:

## Deleting MetaBots

In some cases, you might want to delete an existing MetaBot.

Tip: It is recommended that you do not attempt to delete MetaBots from a file system.

To delete a MetaBot, follow these steps:

1. In the 'My MetaBots' List, select (highlight) the MetaBot you want to delete.
2. Delete the MetaBot using one of the following methods:
  3. • In the Edit menu, select Delete.
  - In the Actions button, select Delete from the drop-down list.
  - Right click the MetaBot and select Delete.

Tip: Ensure the MetaBot is closed in MetaBot Designer. Also, note that if the corresponding MetaBot is the only MetaBot that is opened in the MetaBot Designer while deleting, you need to exit from MetaBot Designer.

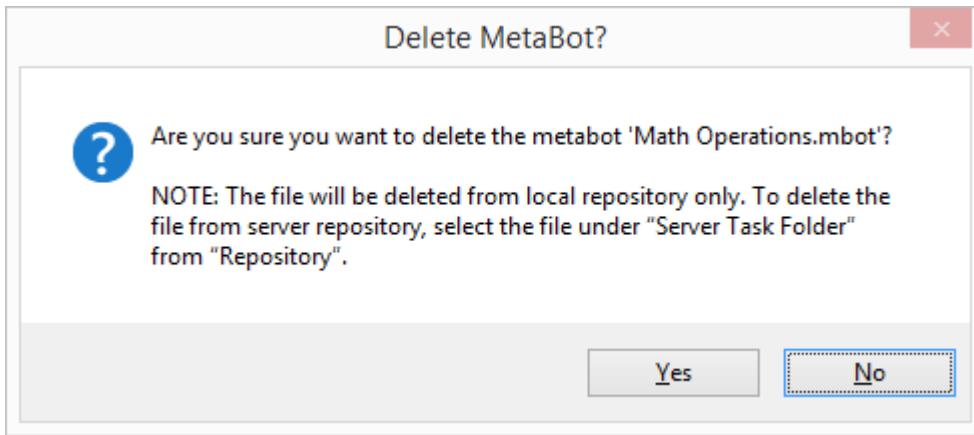
4. In the Delete MetaBot? window, click on Yes.
  - The MetaBot is removed from the 'My MetaBots' List view.

Note: After deleting a MetaBot, you cannot restore it in the Client. Before deleting a MetaBot, ensure you no longer have use for that MetaBot.

Note: As a best practice, ensure all MetaBots are copied to the Enterprise Control Room repository as a way of backing up your MetaBots.

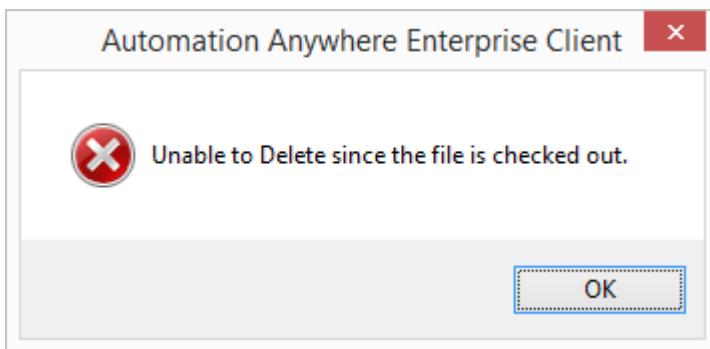
## Deleting a MetaBot if Version Control is enabled

If you have version control enabled, while deleting the MetaBot from the Client, apart from confirmation, you will be notified that it will be deleted locally only.



Note: To delete the MetaBot from the Enterprise Control Room repository, you will have to select it from the relevant folder of the repository.

If the MetaBot is checked out, you will not be allowed to delete it.



## Enabling Version Control

The MetaBot Designer has an integrated feature on Version Control that allows MetaBot users to manage various versions of MetaBots and enforce controlled edits.

Note: Automation Anywhere supports Subversion v1.8.13 and v1.8.14 with Visual SVN Server 3.3.x

(Image as seen in Enterprise Client - MetaBot Designer version 10.3)

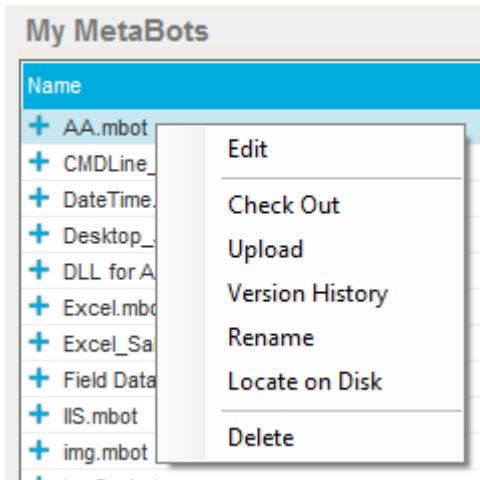
Control the versioning of MetaBots in Clients by enabling the feature from Automation Anywhere Enterprise Control Room.

[Learn More](#)

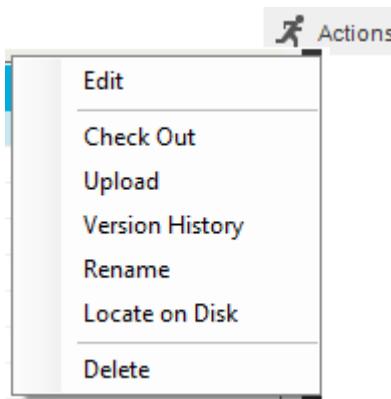
## Using Version Control in MetaBot

To perform controlled edits to your MetaBots, use versioning to create new files, check out for edit, upload with comments and view the version history.

You can context click the MetaBot in the 'My MetaBots' list view of the Enterprise client.



You can also perform similar operations using Actions.



**Tip:** Ensure the MetaBot is closed in the MetaBot Designer Client. Also, note that if the corresponding MetaBot is the only MetaBot that is opened in the MetaBot Designer while performing these operations, you need to exit from the MetaBot Designer Client.

Perform the operations detailed below using either context click or 'Actions'.

1. **Edit:** You can edit a MetaBot from the 'My MetaBots list' provided it has been 'Uploaded' and 'Checked Out'. On editing, you are guided to the 'Assets' view of the selected MetaBot in the MetaBot Designer. Here, you can opt to add/record screens, dll's, and add/update Logic(s).

A new MetaBot created in the local repository (of the Client) has a plus sign (+) appended to the MetaBot name.

2. **Check Out:** A MetaBot that already exists in the Enterprise Control Room repository can be checked out for editing. A check mark (✓) indicates the file is checked out for editing.

The option toggles to 'Undo Checkout' once the MetaBot is checked out for editing. This enables you to undo the last update(s) to the checked out file. Select 'Yes' to confirm:

3. Upload: Post editing, you can upload a MetaBot to the Enterprise Control Room repository with comments. No prefixed icon/sign denotes a successful upload. This ensures that the version history can be used as a reference point by the Client. You can also opt to upload MetaBot(s) from the My MetaBots folder in the Repository.



#### [Uploading MetaBots to Enterprise Control Room](#)

4. Version History: You can view revisions to a MetaBot and if required, roll back any updates. It allows you to identify the user and relevant 'Action' that was performed during a specific 'Date and time' with relevant check in 'Comments'. [Viewing Version History](#)
5. Rename: You can rename a selected MetaBot in the local repository provided it has not been checked out. Note that if you rename a MetaBot and upload to the repository, it will overwrite the existing MetaBot with the previous name. The version history will be lost in such case. See [Renaming MetaBots](#).
6. Locate on Disk: In some cases, you might want to locate the MetaBot that is associated with an automated task you've created.

Automation Anywhere MetaBot files have the file extension of: '.mbot'

To locate a MetaBot on your computer, follow these steps:

- a) In the main Automation Anywhere window, select the MetaBot in the My MetaBots List for which you want to locate the .mbot file.
- b) Either click on the Edit menu or on the Actions button, and select 'Locate on Disk'. The MetaBot files are listed in the File Explorer.
- c) Locate the automation MetaBot file. The .mbot name matches the name you've assigned to the MetaBot.
7. Delete: You can delete a MetaBot from the local repository provided it has not been checked out. [Deleting MetaBots](#)

## Viewing Version History

Use Version History to view the history of updates to the selected MetaBot. Also roll back updates, if required.

On selecting Version History, you will be able to view a list of all revisions created for the selected MetaBot.

## Viewing history of file versions

You can view 'Version History' of the selected MetaBot from:

1. The Context Menu:

OR

2. Actions list:

3. On selecting Version History, you will be able to view versioning details for the selected MetaBot:

The Version History is displayed in descending order of the time-stamp i.e. the latest revision at the top and the first revision at the bottom. It allows you to identify the user and relevant 'Action' that was performed during a specific 'Date and time' with relevant check in 'Comments'.

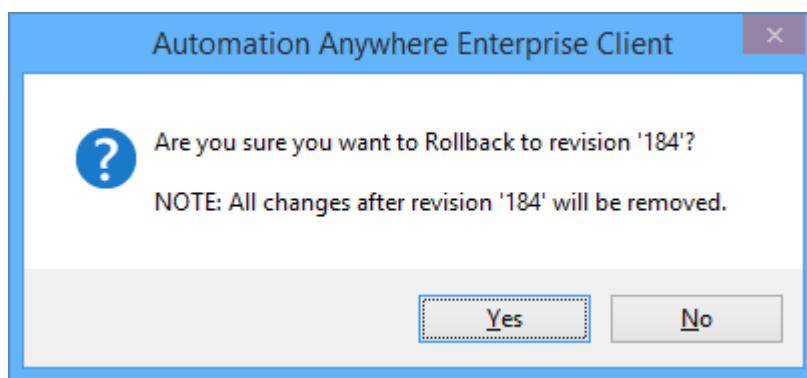
## Rollback Updates

You can also rollback the updates to a specific revision. Use this to revert updates/changes in the selected MetaBot to the selected revision from the version history.

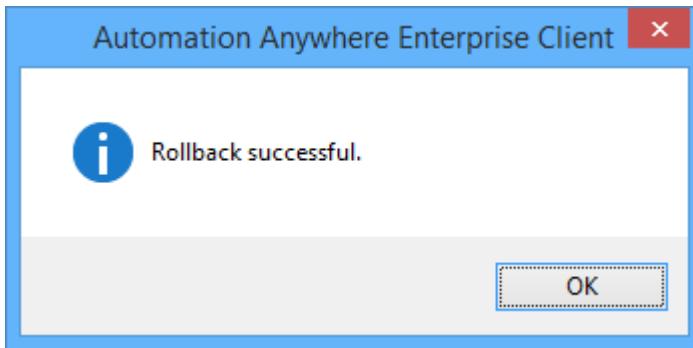
**Rollback**

 Tip: Ensure MetaBot Designer client is closed before using Rollback.

Select the revision to which you want the updates to be rolled back and confirm:



On confirming, all the changes done since the selected revision to the latest revision will be rolled back and a success message is displayed:



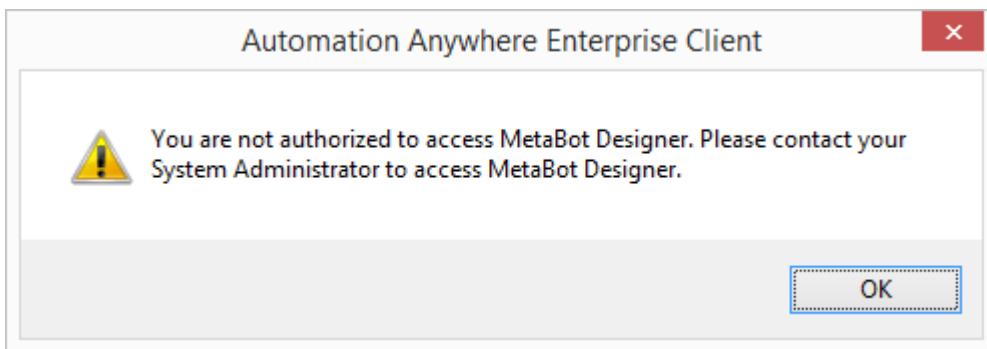
 Note: It is recommended you check in (upload) the file once it is rolled back to the selected revision so that the latest revision(s) are reflected in the updates.

## Using MetaBot Logic in TaskBots and MetaBot Logics

As a Bot Creator you can integrate Logic in your TaskBots as well as other MetaBot Logics in the Automation Anywhere Workbench to create automation.

Based on your work-flow, you can add either one or more Logic from a single MetaBot or multiple Logic from various MetaBots to another TaskBot or MetaBot Logic.

Tip: You should have AAE\_MetaBot Designer access privileges to add a MetaBot Logic to another MetaBot Logic. If you do not have required permission, you are shown the following message when you attempt to add a MetaBot:



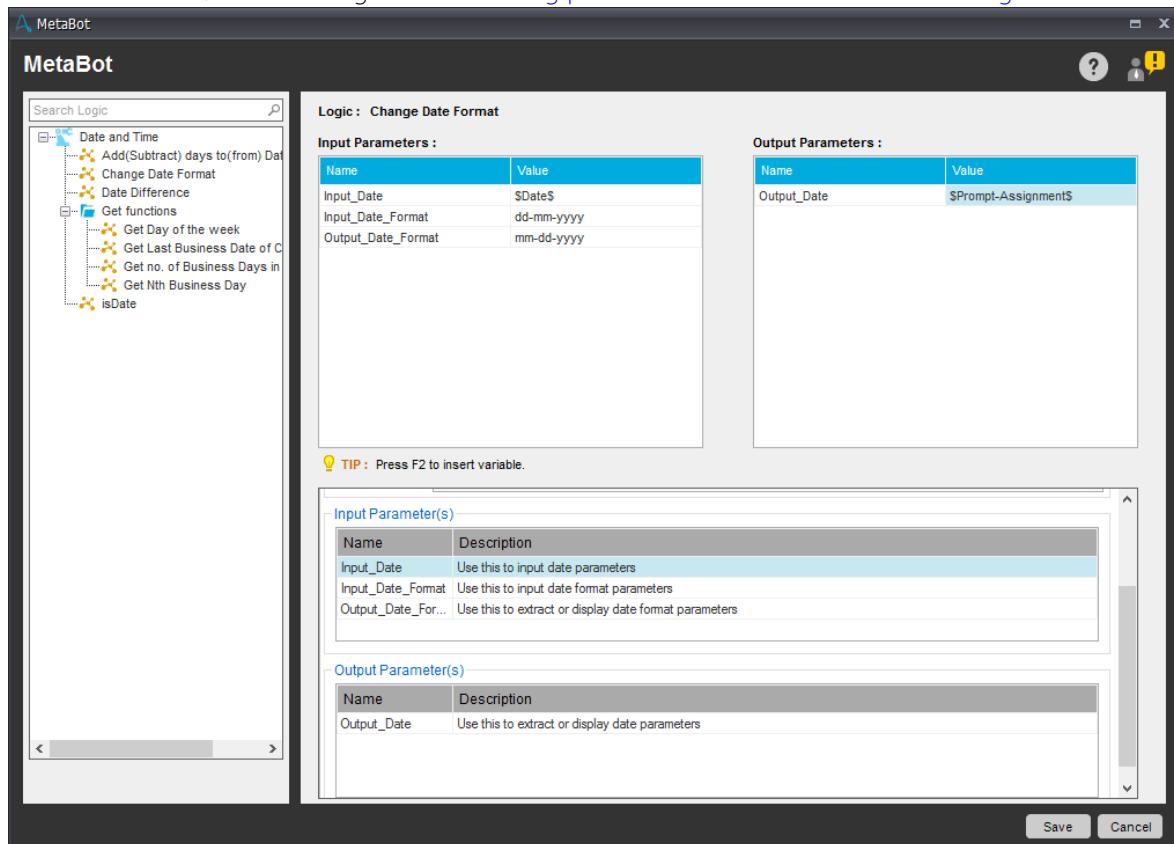
## Adding MetaBot Logic to a TaskBot

1. To begin, click on the MetaBot section given at the top of the command panel in the Workbench
2. Double click/drag and drop a MetaBot from the list of MetaBots.
3. The MetaBot window is launched :
4. Select the desired logic from the list or folders as required. If this logic needs certain values and/or variables as input and/or output, they get listed under the Input and/or Output Parameters pane. Otherwise, the parameter tables appear empty.

- If Input and InputOutput parameter type variables are available in the Logic, you can assign a value or variable required as an input in Input Parameters pane.
  - Similarly, if Output and InputOutput parameter type variables are available in the Logic, you can assign another variable as an output in Output Parameters pane.
  - Refer [Variables - Parameter Types](#) and [Passing parameters from and to MetaBot Logic](#) for details.  
Tip: Use the 'Search Logic' facility to navigate to the Logic you want.
5. If you have assigned variables in the logic, you will have to assign the required set of values to the Input and Output Parameters.

- You cannot leave these blank.
- You can also assign variables to the Input and/or Output Parameters from the list of variables available in the task.
- If the Input and/or Output parameters require use of credentials or sensitive data, you can opt to use 'Credential Variables'. Select the required variable listed under \$CredentialLockers\$ from Insert Variables.

Important: Credential variables are not visible until a Enterprise Control Room user with Locker Admin privileges enables the setting in the Enterprise Control Room. When the setting is enabled, credential variables are available for passing as parameters from one TaskBot/MetaBot Logic to another TaskBot/MetaBot Logic. Read [Passing parameters from and to MetaBot Logic](#) for details.



6. The Description field provides information about the Logic that is being configured. The name of the user who updates the Logic Information and the date and time it was modified is also displayed. Refer [Add MetaBot Logic Properties](#).

Similarly, you can refer the Input and Output parameter Description below the Logic description. This is added when you are creating variables. Refer [Adding, Editing and Deleting Variables](#).

This is highly useful as it provides contextualized help without any clicks, while using the MetaBot Utilities/Logics in TaskBots.

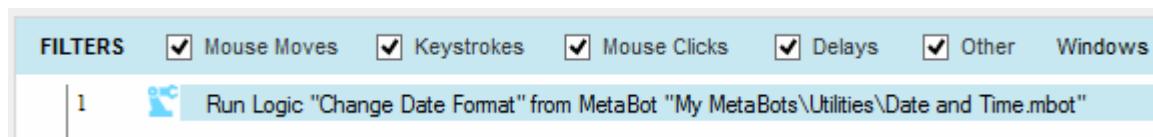
- When you select a variable (from Parameters) the corresponding description is highlighted/ selected.
- If you want to view the description without scrolling, hover your mouse over the Description field and the entire text is shown as tool tip.

Note: If your Logics and Input/Output parameters were created in 10.x versions, by default the description is not shown. However, you can update the Logic description and that is shown once it is edited and saved using the Properties option. Similarly, you can edit the variables to include the parameter description.

7. Once you are done, click Save to include the MetaBot Logic in your TaskBot.

Note: During TaskBot execution, if your target application is open in admin mode, you will have to run the task in admin mode.

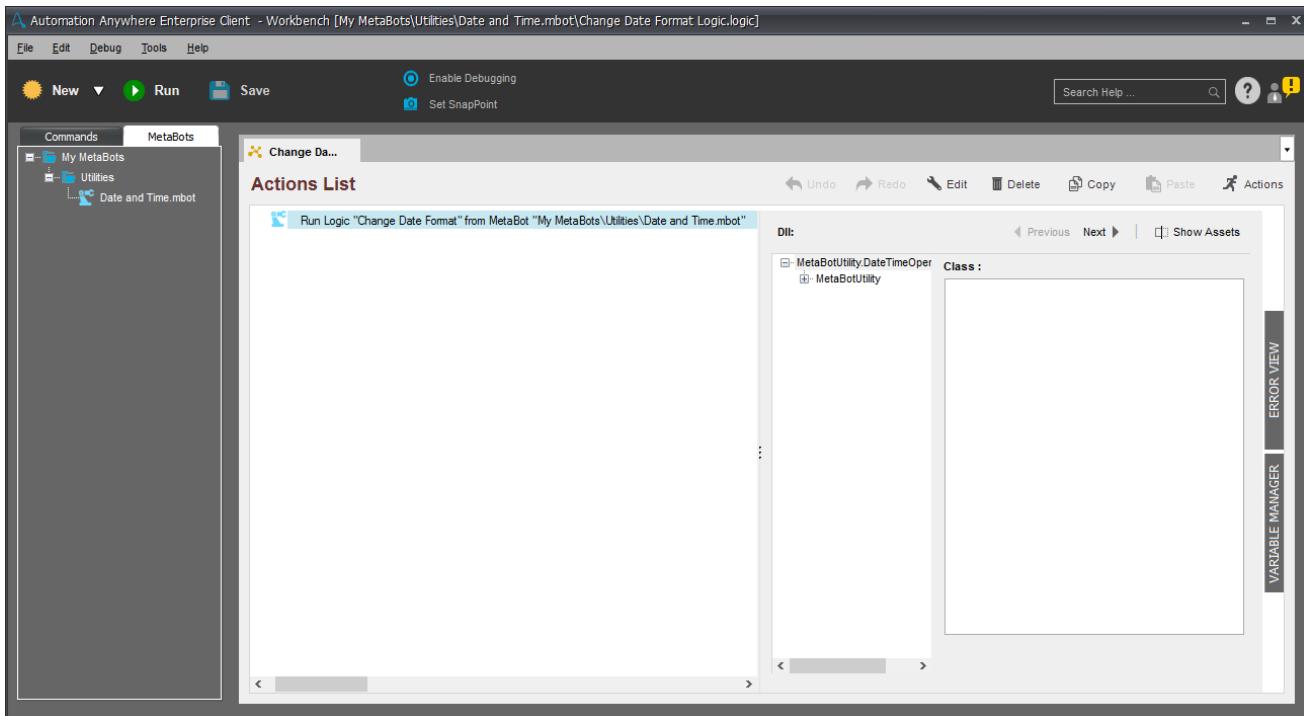
The Workbench depicts the event data for Logic:



## Adding MetaBot Logic to another MetaBot Logic

To add an existing Logic to another MetaBot Logic (new or existing) from the Workbench,

1. Either [Workbench and creating Logic](#) by clicking New or Click Add Logic from the MetaBots view
2. This launches the New Logic window for the selected MetaBot:
3. Select and drag or double click the MetaBot to open it in the Workbench
4. Select the required Logic from the list or folders.
5. Add parameters per your automation flow.
6. Save to include the Logic in your existing or new Logic.



## Add MetaBot Logic Properties

When you create a MetaBot Logic it is easy to remember what end goal that particular automation achieves.

However, as an automation expert, you would want to integrate MetaBot Logic created by fellow automation experts. Similarly, the automation that you create will be used in other automations.

To help decide which automation logic is viable for use in your or other automation, you can add a description to a MetaBot Logic using the Properties option. This serves as an highly useful contextualized help while using the MetaBot Logics and/or Utilities.

You can also add parameter description to Input, Output or InputOutput variables on similar lines. Refer [Adding, Editing and Deleting Variables](#) for details.

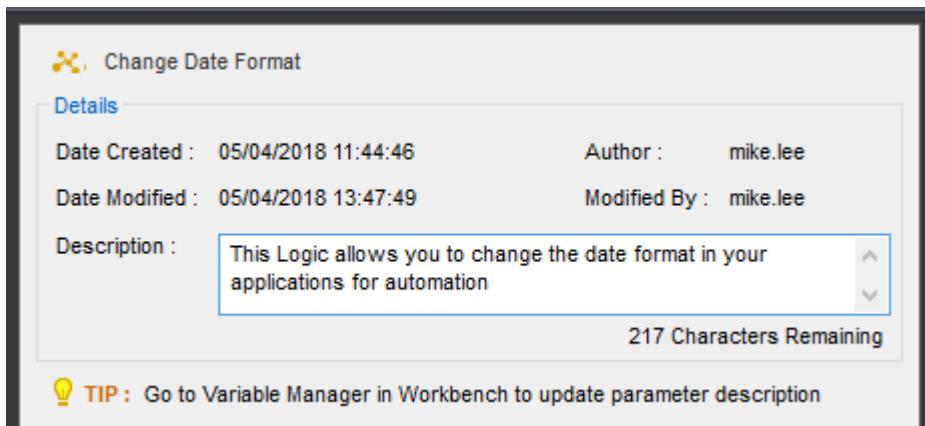
### Add properties to new logic

To add properties to your Logic,

1. Create and save a MetaBot Logic.
2. Open the MetaBot
3. Go to Logic view
4. Right click the <Logic>
5. Select Properties
6. This launches the Logic Properties window:

7. In the Description field describe the purpose that this MetaBot Logic will achieve, some useful tips and tricks or any other information that could be useful for using the logic in a TaskBot/MetaBot Logic.

- You can view this description when you are using the Logic from a TaskBot/MetaBot Logic while passing the parameters.



Tip: You can add maximum 300 characters in the Description field.

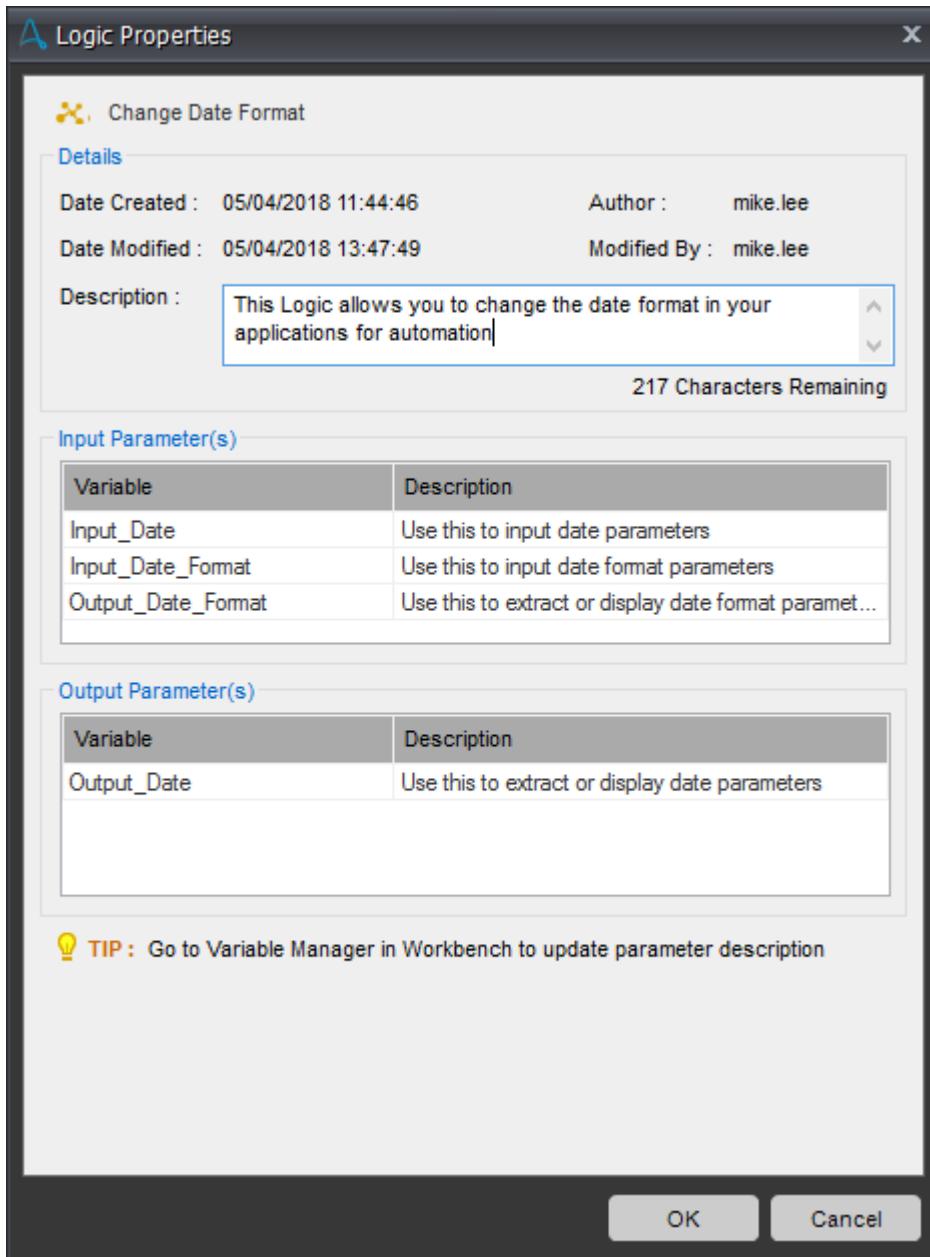
8. Click OK. This saves the description.

Tip: You can add parameter description from Workbench → Variable Manager → Add variable

## Edit logic properties

You can also edit the description field in properties.

1. To open in edit mode, right click the <Logic> → select Properties.
2. This launches the Logic Properties window:



- The parameter description is shown in read only mode which can be added/modified while creating/editing corresponding variables. Refer section on [Adding, Editing and Deleting Variables](#) in Creating variables.
3. Edit the description as required.

Note: When you open the properties window in edit mode, Details such as Date Created, Author, Date Modified, and Modified by are shown. If the parameter description is added, it is also shown in Input Parameter(s), Output Parameter(s), and InputOutput Parameter(s) fields as applicable.

## Add/Edit description in existing 10.x Logic

If you are using MetaBot Logics that were created in any of the AAE 10.x versions, the parameter description will have to be added as it is not updated by default. Refer section on [Adding, Editing and Deleting Variables](#) in Creating variables.

## Debug Log for Autologon

Enable debug logging for autologon.

Enable debug logging.

## Procedure

1. Browse to C:\Users\Public\Documents\Automation Autologin/<yourusername>
2. Edit the Automation.Autologin.Settings.XML file.
3. Include <log><debug>true</debug></log> within the <AutoLogin> XML element and save the XML file.
4. Create a folder with the name LogFiles in C:\Users\Public\Documents\Automation Autologin.

```

1  <?xml version="1.0" encoding="UTF-8"?>
2  <configuration>
3  <AutoLogin>
4  <machinestatus>
5      <beforelaststatus>SessionLock</beforelaststatus>
6      <laststatus>SessionUnlock</laststatus>
7      <currentstatus>SessionUnlock</currentstatus>
8  </machinestatus>
9  <legalnotice>
10     <bypass>false</bypass>
11  </legalnotice>
12  <log>
13      <debug>true</debug>
14  </log>
15 </AutoLogin>
16 </configuration>

```

## Resolving technical issues

Automation Anywhere is committed to outstanding customer care. As a valued customer, your time is important and we would like to help resolve your issues as soon as possible.

Depending on the nature of your issue, follow these steps:

1. See [Automation Anywhere University \(AAU\)](#) for e-learning courses and training topics.
2. See [online examples and demos and videos](#).
3. For Community Edition users:
  - a) See [A-People Community](#) and search the federated tool for latest community discussions and topics of the product.
4. For Enterprise Edition licensed users:
  - a) See [A-People Community](#).
  - b) See [A-People Knowledge Base](#) for further assistance.
  - c) See [Help Desk](#) for [FAQs](#), [Knowledge Base](#), and other support resources.
  - d) For more assistance, open a new Support Case.

## How to create a new Support Case

To open a new Support Case, access the [Customer Support Portal](#) and log in using your [Single Sign-On \(SSO\)](#) account credentials. A Support Team representative will contact you shortly.

- [Using Automation Anywhere Consulting Services](#)

The Automation Anywhere team is led by industry experts in the business process automation field. We've helped major companies from around the world automate their key business and IT processes.

- [Requesting Live 1-on-1 Demos](#)

## Using Automation Anywhere Consulting Services

The Automation Anywhere team is led by industry experts in the business process automation field. We've helped major companies from around the world automate their key business and IT processes.

The Automation Anywhere team is focused on streamlining the implementation of automation, and maximizing customer ROI.

We bring years of experience and best practices in dramatically reducing implementation time to ensure your team is successful.

Our services consultants are ready to provide expert, efficient hands-on training and implementation.

Both on-site and remote implementation services are available that provide:

- Implementation and consulting for simple and complex automation projects
- An unwavering focus on your company's objectives
- Best practices for business and IT process automation that maximize ROI and minimize risk
- When you engage the Automation Anywhere Consulting team, you are assigned a dedicated customer agent who is familiar with your domain, requirements, technologies, and environment.
- If appropriate, your consultant can remotely log into your computer to help you automate processes and guide you with your project.

Automation Anywhere helps you to automate any of the following processes:

1. Business processes
2. IT processes
3. Extraction of data from the Web

- 
- 4. Data transfer from one application to another
  - 5. ERP (Enterprise Resource Planning) data entry and integration processes
  - 6. File and data management processes

Find out more about our consulting services by submitting the [Consulting Services Request Form](#). A representative will contact you shortly.

## Requesting Live 1-on-1 Demos

- Do you have a specific question about an Automation Anywhere feature?
- Are you confused about how to automate a particular process?
- Do you have questions about how to work with applications while automating processes?

For help with any of these issues, contact the Automation Anywhere Support team.

Our team members are happy to demonstrate features, answer your questions, and show you various automation scenarios.

[Request a Live Demo](#) now.

## Is your issue more complicated?

Learn about our [Automation Anywhere Consulting Services](#), and how we can help you to automate more complex processes.

## Troubleshoot Enterprise client

Use the links listed in this topic to troubleshoot issues in Enterprise client.

- [Troubleshooting Excel Command Tasks](#)  
If a task that contains Microsoft Excel commands runs very slowly, follow these steps to resolve the problem:
- [Update Enterprise client settings file for Excel command](#)  
The behavior for the Excel Command options Contains Header and Each row in Excel Dataset has changed from Version 11.3.1 onward. If your TaskBots for Excel automation are using these options and you need to revert back to the previous behavior, refer the steps described in this topic to forgo this change.
- [Configuring Terminal Emulator logs](#)  
Terminal Emulator log files sometimes occupies too much disk space if they are not restricted to a limited size. To optimize disk space, use the Automation Anywhere Enterprise client's feature that enables configuring intervals for cleaning terminal logs.
- [Automation Anywhere Diagnostic Utility](#)  
The Automation Anywhere Enterprise Diagnostic Utility is an automated checkpoint verification tool that is used to view application relevant information and diagnose errors with the application for quick resolution.
- [Client Login Errors](#)  
As a bot user when you login to Client, you may get errors depending on the input that is provided. To

adhere to the compliance needs of an organization these errors are also captured in the Enterprise Control Room Audit Logs.

- [Enabling the Debugging Option](#)

Automation Anywhere enables you to debug your complex automation tasks, which can be useful for automating longer, more complicated business or IT processes.

- [Enterprise client Frequently Asked Questions](#)

Use the Frequently Asked Questions (FAQs) section for answers to troubleshoot some common issues relevant to registration, and management of the Automation Anywhere Enterprise client.

- [Logging into Windows when Application Paths Change](#)

Occasionally, the application path for your Automation Anywhere tasks might require changing. For security reasons, you can set the Windows Login option in Advanced Settings to change the application path of your tasks.

- [Using the Error View](#)

Task Editor provides two options for viewing and fixing task errors and working with task variables.

- [Resolve File and Folder trigger issues](#)

Use a settings based monitoring mechanism to resolve file and folder based trigger issues when the connection to the remote server hosting the folder/file is lost.

## Troubleshooting Excel Command Tasks

If a task that contains Microsoft Excel commands runs very slowly, follow these steps to resolve the problem:

1. Disable the Debug mode.
2. Remove or reduce the Delay commands by 1 second.
3. Minimize the Microsoft Excel files. When Microsoft Excel is in a maximized state, it displays the user interface and consumes resources.
4. Stop capturing screen shots when running the task. Follow these steps:
  - a) On the Automation Anywhere main window, click the Tools menu and select Options.
  - b) Select Run Time Settings.
  - c) Uncheck the Capture Screenshots while Running a Task option

Be aware that screenshots will not be captured when running the task, so monitoring progress is more difficult.

## Update Enterprise client settings file for Excel command

**11.3.1.3 | 11.3.3 |** The behavior for the Excel Command options Contains Header and Each row in Excel Dataset has changed from Version 11.3.1 onward. If your TaskBots for Excel automation are using these options and you need to revert back to the previous behavior, refer the steps described in this topic to forgo this change.

### Prerequisites

In Enterprise client before Version 11.3.1, when the option Contains Header is selected, the counter increments from row 2 instead of row 1, which is defined as the header row. Similarly, when the option Each row in Excel Dataset loop is used with Set Cell, the cell row increments.

If you have upgraded to a later version and you need to revert to the previous behavior for your Excel automation, you have the option to update the configuration `<retainexcelcellrowlegacybehavior>` in the AASettings.xml file.

Attention: In the current version, when you run the Enterprise client for the first time, the node is added automatically as follows:

```
<retainexcelcellrowlegacybehavior>false</retainexcelcellrowlegacybehavior>
```

To revert to the legacy behavior of the Excel command, follow these steps:

## Procedure

1. Navigate to the application path on your machine.

For example, D:\<username>\My Documents\Automation Anywhere Files

2. Open the AASettings.xml file in edit mode

Note: You must have appropriate privileges to update the AASettings.xml file.

3. To revert to the previous behavior, set the value for the excel cell row legacy behavior node to true:

```
<configuration>
  <player>
    <commands>
      <excel>
        <retainexcelcellrowlegacybehavior>true</retainexcelcellrowlegacybehavior>
      </excel>
    </commands>
  </player>
</configuration>
```

You have the following options:

Option	Action
false	Add to continue existing behavior implemented from Version 11.3.1 onward.
true	Add to go back to the legacy behavior before Version 11.3.1.

Tip: Add the node if it is missing in the settings file.

4. Save

## Next steps

Verify by running the bots for Excel automation.

---

Related reference

[Version 11.3.1 Release Notes](#)

## Configuring Terminal Emulator logs

Terminal Emulator log files sometimes occupies too much disk space if they are not restricted to a limited size. To optimize disk space, use the Automation Anywhere Enterprise client's feature that enables configuring intervals for cleaning terminal logs.

To configure Terminal Emulator logs:

### Procedure

1. Open the AA.Settings file available at Automation Anywhere Enterprise client application path.
2. Specify the number of days to preserve log file in the following tag:

```
<Player>
  <commands>
    <terminalemulator>
      <numberofdaystopreservelogfiles>30
      </numberofdaystopreservelogfiles>
    </terminalemulator>
  </commands>
</Player>
```

Valid range is from 1 to 60 Days. The default value is 7 days.

For example, if the interval is set to 7 days, the log files older than 7 days will be deleted on clean-up action. The clean-up action takes place everyday.

Related reference

[Terminal Emulator command](#)

## Automation Anywhere Diagnostic Utility

**11.3.1.1** The Automation Anywhere Diagnostic Utility is an automated checkpoint verification tool that is used to view application relevant information and diagnose errors with the application for quick resolution.

### Prerequisites

The following requirements should be fulfilled for the utility to work as expected:

- Enterprise client should be installed for this utility to work.
- The bot user should have logged into the Enterprise client at least once.

- The utility is bundled with the Automation Anywhere Enterprise client setup and can be run as a diagnostic tool at any point in time to set check points for verifying errors and issues.
- The utility can also check whether Automation Anywhere Control Room is installed on the same machine where the Enterprise client exists.

The diagnostic utility can be run from any of the file locations provided it is run on the machine in which the Enterprise client application is installed. It does not necessarily have to be from the application installation path.

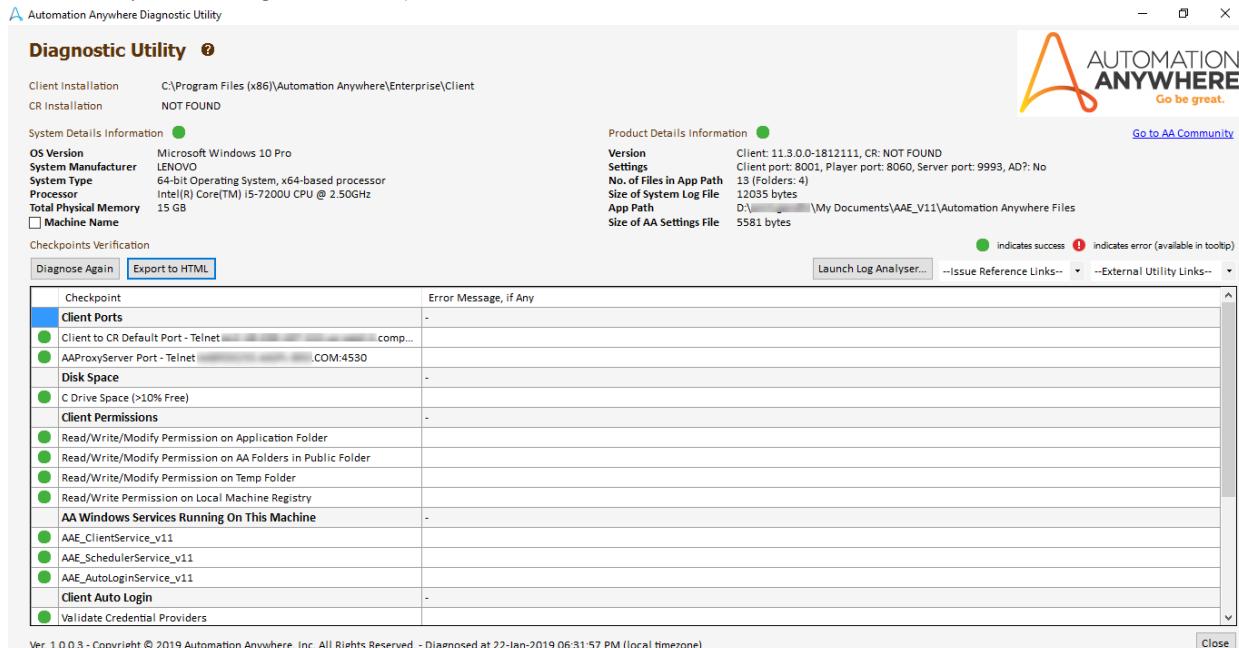
## Procedure

1. Navigate to the path where the utility is stored.

For example, C:\Program Files (x86)\Automation Anywhere\Enterprise client

2. Run the utility.

The diagnostic utility form is launched. It automatically diagnoses system and product details as well as checkpoints for firewall ports, disk space, access rights and permissions, services, auto login, web socket, object cloning, and Enterprise Control Room details as illustrated:

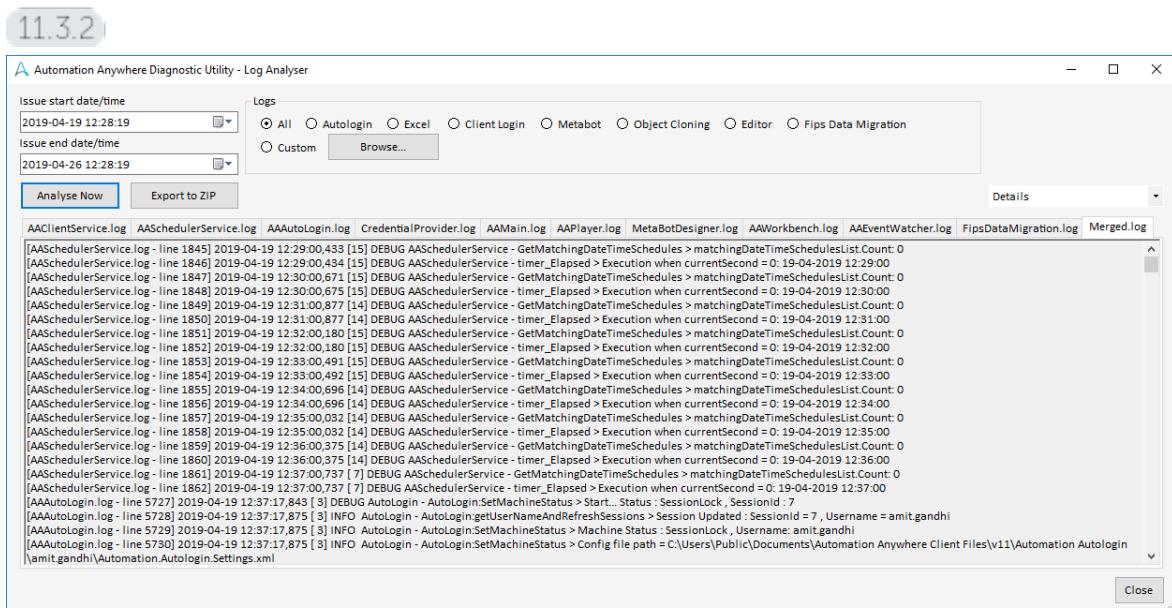


Tip: Use the Issue Reference Links and External Utility Links to connect to online knowledge base and community articles.

3. Click Diagnose Again to reverify the checkpoints.

- a) Optionally save the checkpoints by using Export to HTML
- b) Click Launch Log Analyzer to analyze log relevant to Audit, Autologin, Excel, Client Login, MetaBot, Object Cloning, Workbench, and FIPS Data Migration.

Tip: Customize the log options by clicking Browse and select logs from a custom location.



**Tip:** **11.3.2** In the Log Analyzer window, you can view the selected Logs in consolidated from sorted on date/time in the Merged.log tab. For easy reference, the logs are shown with its line number.

- c) Optionally, save the logs by using Export to Zip
- d) Change the log view from Details to Errors if you wish to see only the errors that are shown highlighted when in Details view

## Next steps

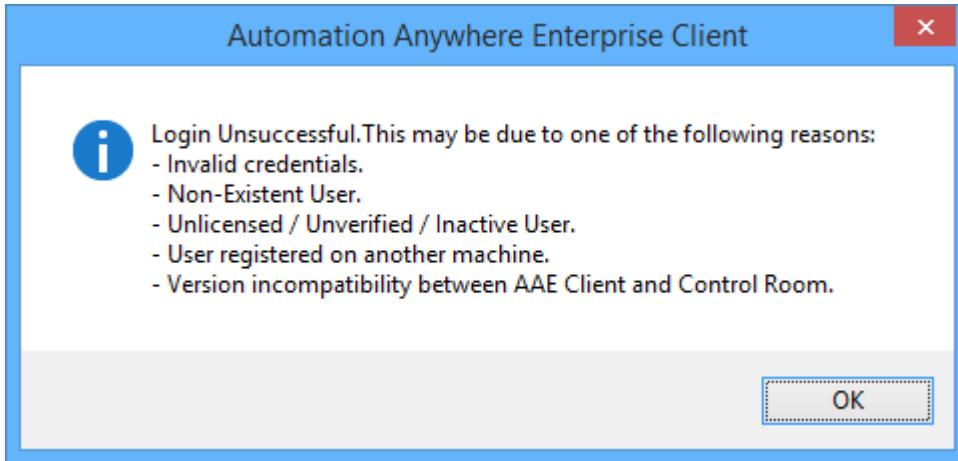
The automated checkpoint error messages and logs collected through the Automation Anywhere Diagnostic Utility can then be used to resolve Automation Anywhere application issues.

## Client Login Errors

As a bot user when you login to Client, you may get errors depending on the input that is provided. To adhere to the compliance needs of an organization these errors are also captured in the Enterprise Control Room Audit Logs.

**Tip:** If you need clarity on the type of error that you encounter and remedial steps, refer the errors documented in this article or contact your Enterprise Control Room administrator.

## Error-1: Login Unsuccessful



You will get the above error in the following cases:

- When you provide invalid UserName and/or password
- The user you are trying to login as has been not been created in Enterprise Control Room
- The user you are trying to login as has not been allotted a license (Development/Runtime) in the Enterprise Control Room
- You have not verified your user account using the email sent from Enterprise Control Room
- The user you are trying to login as has been deactivated in the Enterprise Control Room
- The user you are trying to login as has already been registered into the Enterprise Control Room from a different machine
- The user you are trying to login as has registered to the Enterprise Control Room under different Windows credentials

## Remedial Actions

- Provide valid UserName and password
- Check with your Enterprise Control Room admin that the user you are trying to login as indeed exists in the Enterprise Control Room
- Check with your Enterprise Control Room admin that the user you are trying to login as has been allotted either a Development or Runtime license in Enterprise Control Room
- Verify your Automation account using the mail sent from Control Room (in cases where Enterprise Control Room is configured with outgoing mail server). This verification mail will have the subject "Your Automation Account is Created"
- Check with your Enterprise Control Room admin that the user that you are trying to login as has 'Active' status in Enterprise Control Room
- Check with your Enterprise Control Room admin whether the user you are trying to login as has already registered into Enterprise Control Room from a different machine. If yes, you will not be able to login
- Windows Credential check. This can be better explained with the below mentioned example:

Valid Login Scenario:

- Tom logs in into his laptop (say TomLaptop) using his Windows Credentials (say Tom.Watson)

- Tom starts the AAE Client and puts in his AAE UserName (say Tom\_AAE) and a valid password into the AAE Client Login window and registers to the Enterprise Control Room
- Tom\_AAE user has now registered into the Enterprise Control Room from TomLaptop under Tom.Watson Windows Account

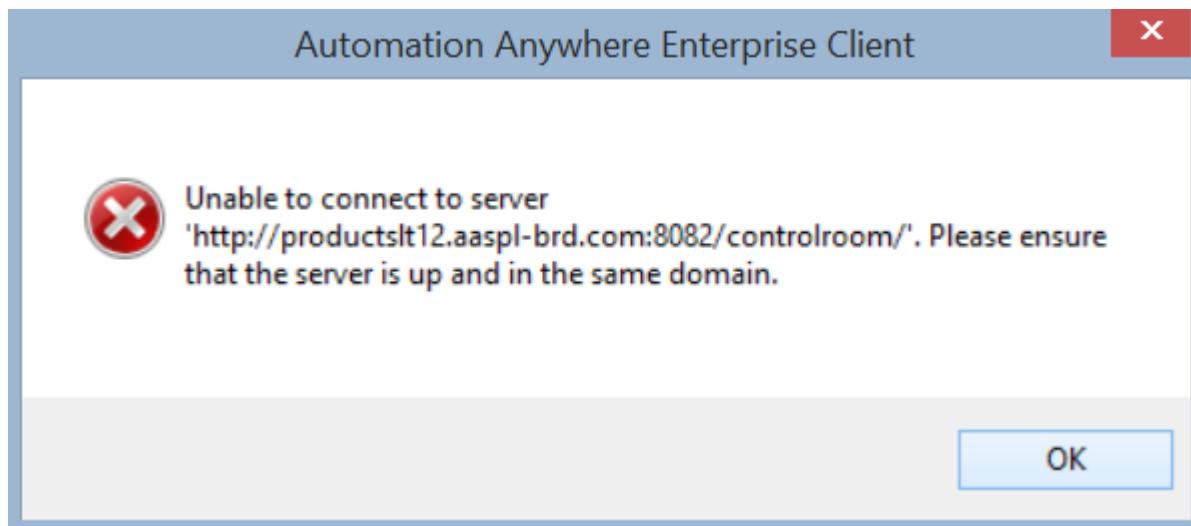
Invalid Scenario: Machine Change> Login Failure

- Tom's laptop crashes and Tom gets a new temporary laptop (TempLaptop)
- Tom logs in into TempLaptop with his Windows Credentials (Tom.Watson), installs AAE Client on TempLaptop and tries to login as Tom\_AAE user from the AAE Client
- Tom will NOT be logged in as Tom\_AAE, as user has already been registered from TomLaptop.
- Enterprise Control Room Admin deletes Tom\_AAE user from Enterprise Control Room
- Enterprise Control Room Admin creates new user with the same name (Tom\_AAE)
- Tom can then login as Tom\_AAE from TempLaptop
- Tom\_AAE user has been registered into Control Room from TempLaptop under Tom.Watson Windows Credentials.

Invalid Scenario: Windows Credentials Change> Login Failure

- John logs in into TempLaptop using his Windows Credentials (say John.Smith)
- John starts AAE Client and puts in Tom's AAE UserName (Tom\_AAE) and a valid password into the AAE Client Login Window
- John will NOT be able to login into AAE Client; as that user (Tom\_AAE) has already registered under Tom.Watson Windows credentials

Error-2: Unable to Connect to Server



You will get the above error in the following cases:

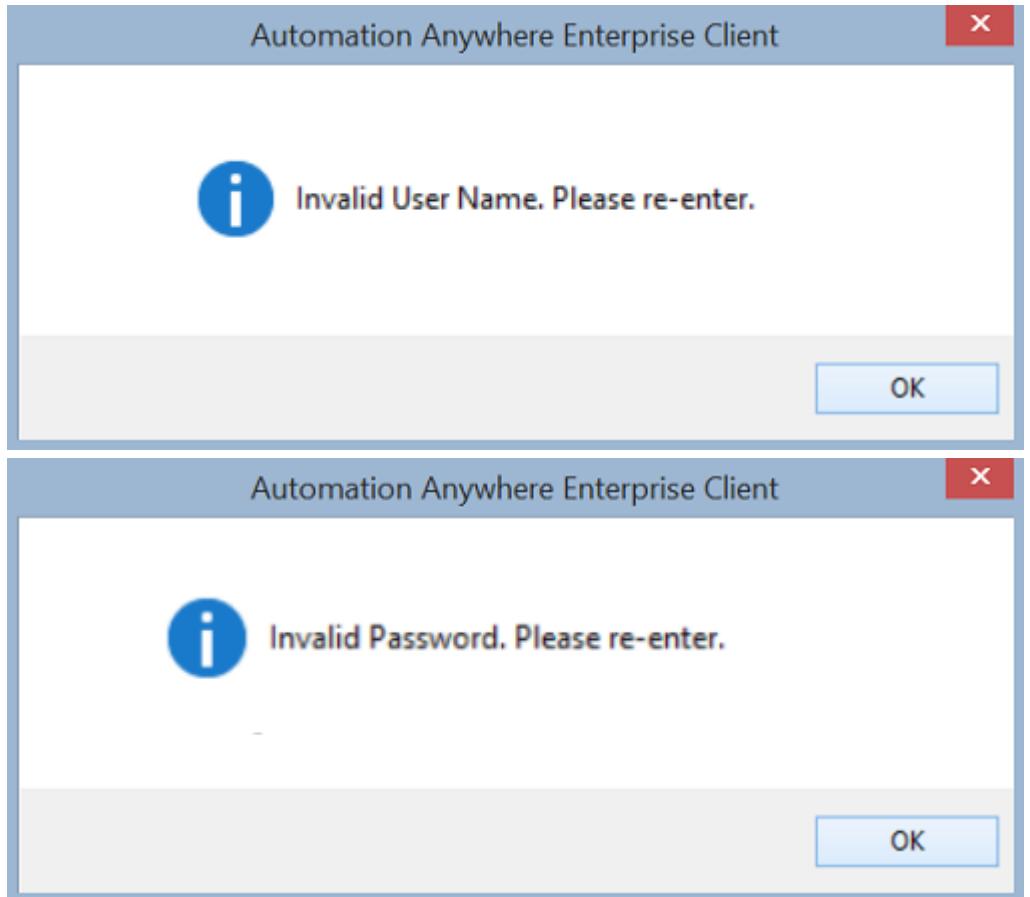
- The Enterprise Control Room URL provided in the login is incorrect
- The AAE Client machine is not able to connect to Enterprise Control Room URL

## Remedial Actions

- Check that the Enterprise Control Room URL mentioned in the login is correct

- Open a web-browser on the AAE Client machine and navigate to the Enterprise Control Room URL.  
You should be able to see a login screen if you are not logged in into the Enterprise Control Room
- Ensure that the port mentioned in the Enterprise Control Room URL is open for communication

### Error-3: Invalid User Name / Password

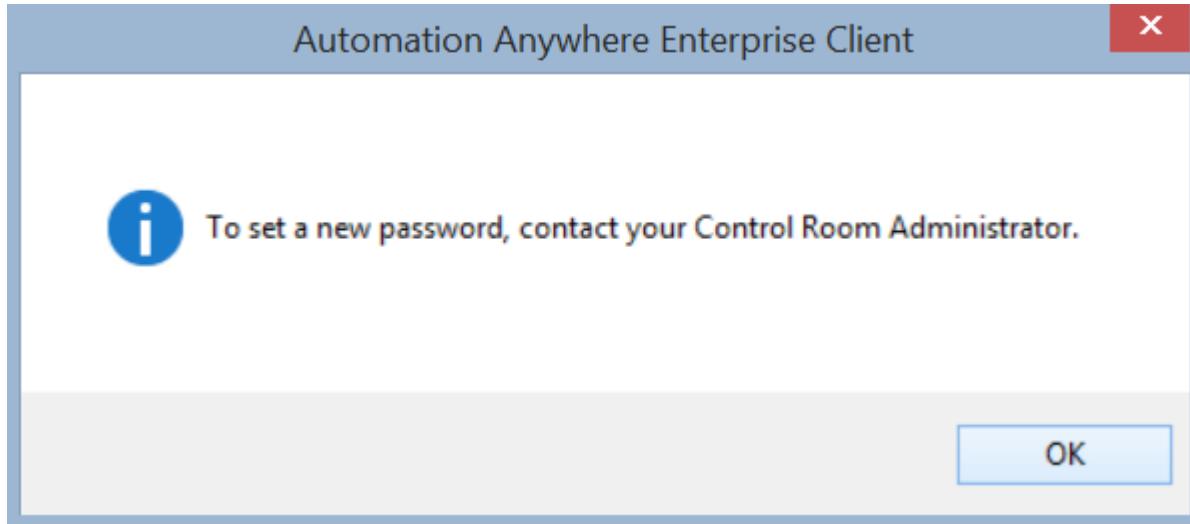


You will get this error if any of the User Name or password field is not provided

### Remedial Action

- Provide a valid UserName and password

## Error-4: Forgot Password



You will get this message when you click on 'Forgot Password' on the AAE Client login

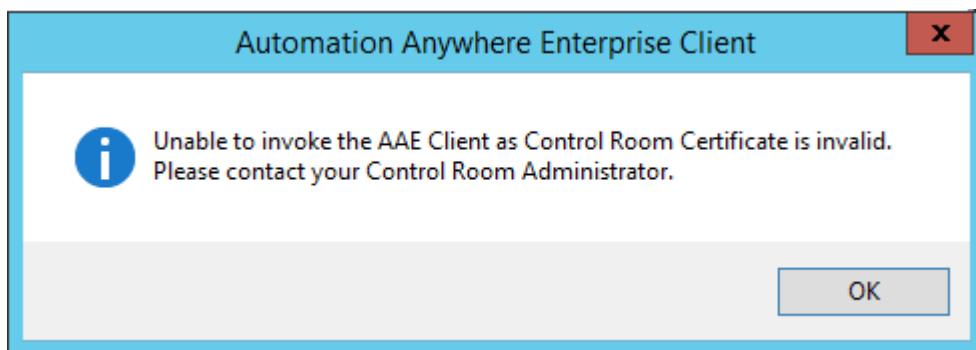
### Remedial Actions

For Enterprise Control Room configured without SMTP (outgoing mail server): Contact the Enterprise Control Room Admin and request him/her to reset the password against your user

For Enterprise Control Room configured with SMTP:

- Open the Enterprise Control Room in a web-browser
- You will get the login window.
- On the login window, provide your AAE username and click 'Forgot Password' on the web-page.
- You will get a confirmation mail on your registered email account that will enable you to reset your AAE password.

## Error-5: Invalid Certificate during login



You might face an invalid certificate error when you log on to your Enterprise Control Room instance from the Client if the Enterprise Control Room certificate:

- Is not present
- Is invalid
- Has expired
- Is from an untrusted authority

Note: The above error message will only be shown if the AAE Client machine has the following registry entry:HKEY\_LOCAL\_MACHINE\SOFTWARE\Automation Anywhere\ValidateServerCertificate with value as 1.

**11.3.2** Starting from Version 11.3.2, irrespective of the value assigned to the registry entry HKEY\_LOCAL\_MACHINE\SOFTWARE\Automation Anywhere\ValidateServerCertificate, the above error message will be shown if the Enterprise Control Room certificate is invalid.

**11.3.2**

## Error-6: Invalid Certificate notification

Suppose you have already logged into the Enterprise client and you are doing an activity which involves the client communicating with the Enterprise Control Room. You might see the following notification message in the system tray if the Enterprise Control Room certificate becomes invalid. The activity will fail and all instances of Enterprise client (including Workbench, MetaBot Designer, Report Designer, and Player) terminate after 10 seconds:

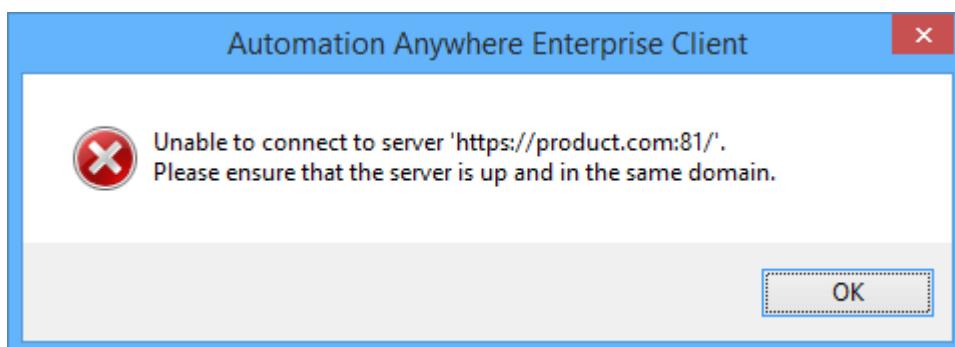


**11.3.2**

## Remedial Action

Contact your Enterprise Control Room administrator.

## Error-7: Version Mismatch

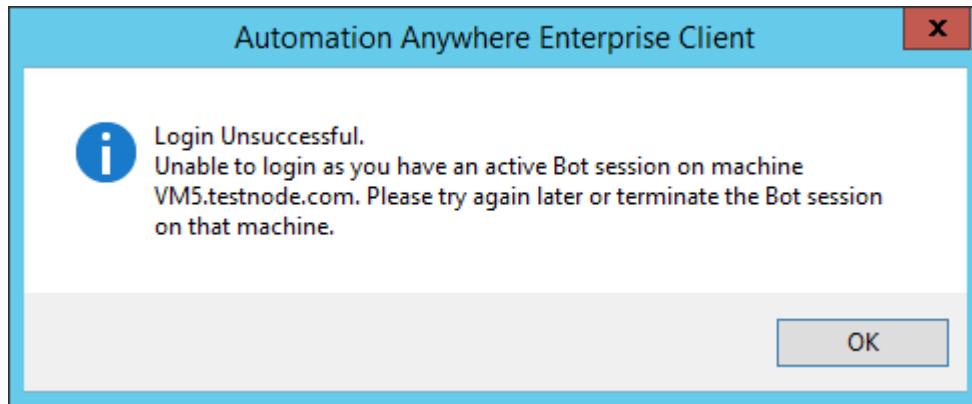


When you log on to a Enterprise Control Room of either higher or lower version, you are shown a version mismatch error.

## Remedial Action

Contact your Enterprise Control Room administrator to ensure you have the compatible versions of Enterprise Control Room and Client installed.

## Error-8: Active Bot Session



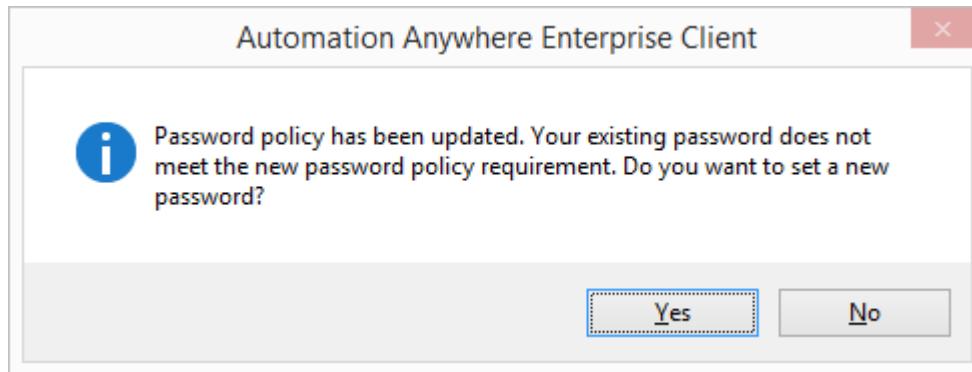
When you try to log on to your Client using a different machine, you are shown the above error if a Bot is deployed to the Client session that is already active on a previous machine. This is possible if your Enterprise Control Room is configured to support a Floating license model.

## Remedial Action

1. If you want to log on to another machine, terminate the Bot session i.e. the player that is active on the previous machine by clicking
2. Wait for the TaskBot to complete and then log on to the other machine.

## Error-9: Password policy updated

When you provide your old credentials during Client Login/ Re-Login or Auto-Login after the password policy is updated in the Enterprise Control Room, you are shown:



## Remedial Action

You will have to update your password from the Enterprise Control Room interface to login.

1. Click Yes to launch the Enterprise Control Room in your default browser.  
Note: If you want to choose to login later, you can click No. You will then stay on the Client login page.
2. Login using your credentials. You are shown the password update page.
3. Change your password to one that meets the new password policy requirements and save.
4. You can now login to the Client.

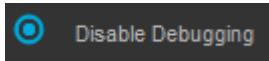
## Enabling the Debugging Option

Automation Anywhere enables you to debug your complex automation tasks, which can be useful for automating longer, more complicated business or IT processes.

### Enabling Debugging

1. Open the task in the Task Editor.
2. Click the Debug menu, and select Enable Debugging.
3. Use the toolbar to insert breakpoints in your task.
4. Debug the task one line at a time by using the Step Over (F10) functionality.

You can use the Set SnapPoint feature in a task to capture images of the task while it runs.



### Debugging

- To debug your task one command at a time, insert a breakpoint next to each command. This makes the task pause at the breakpoint.
- To insert a breakpoint, select a command and press F9 to insert a breakpoint.
- To remove a breakpoint, select the command and press F9.
- Select the Step Over feature to move one command at a time.
- To clear all breakpoints, click Clear All Breakpoints.
- To stop debugging, click Debug > Disable Debugging.

Note:

- Automation Anywhere does not save debugging information and breakpoints. When you close the Task Editor, all breakpoints are lost.
- **11.3.3** The Enable Debugging option is not available for a protected bot.

#### Related reference

[Logging into Windows when Application Paths Change](#)

[Using the Error View](#)

## Enterprise client Frequently Asked Questions

Use the Frequently Asked Questions (FAQs) section for answers to troubleshoot some common issues relevant to registration, and management of the Automation Anywhere Enterprise client.

### How does a user register as a Client with Automation Anywhere?

1. Click the Enterprise client icon to launch Automation Anywhere
2. Click the Server Settings link in the Client Login window
3. Enter the Server IP Address. If the client is on the same system as the server, enter 'localhost'.
4. Select Port used for the server
5. Click Apply and OK
6. In the main client window, click on the Tools menu and select Server Communication.
7. Enter the user name and password provided while registering the client in the Automation Anywhere Enterprise Control Room
8. Click the Login button.
9. If registered correctly, the message 'Registration Successful' is displayed.

### Will a change in the domain name affect the working of my Client?

Yes. The Client that has already been registered and has a domain change, will have to be re-registered as the domain name is required especially while scheduling tasks and using the Auto-Login feature.

Note that you can verify the correct Domain Name in the Machine Information section of Enterprise Control Room for that particular Client.

The Client that has had a domain name changed, can do any of the following (in the sequence mentioned):

1. Change the Application Path in Tools > Options > Advanced Settings. This will ensure that all the data that was available in the earlier path is available to the Client in the current domain.
2. Create a New Client. However, it is recommended that you use this option as a last resort.

### Why is the client only able to view the 'Run' button?

If the Server Administrator does not grant permissions to a client, the client cannot view privileges other than Run.

1. To procure adequate permissions, request Create Task permissions from your Server Administrator.
2. The Administrator grants the Create Task privilege using the Enterprise Control Room, in the Client Control Center, using the Client Information section.
3. For Upload, Download, Delete, and View privileges for a particular folder on the server, request Access Control List permissions from the Enterprise Control Room.
4. After the Access Control List is updated in the Client Control Center and the Create Task privilege is granted, the client must re-login.
5. The client should now be able to communicate with the server using the new privileges.

### How do I copy an Excel cell and move to the next cell in the record?

When you highlight the Excel cell and use Ctrl+C to copy a cell, it copies an extra ENTER keystroke with the data. To copy only the cell, follow these steps:

1. To copy the cell data use the following keystrokes:

```
[F2] [HOME] [SHIFT DOWN] [END] [SHIFT UP] [CTRL DOWN] c [CTRL UP]
```

2. To move the cursor to the next cell after copying the current cell, use the following keystrokes:

- To move one row down in the same column:

```
ENTER
```

- To move to the next cell to the RIGHT in the same row:

```
TAB
```

- To move one row up in the same column:

```
[SHIFT DOWN] [ENTER] [SHIFT UP]
```

- To move to the next cell to the LEFT in the same row:

```
[SHIFT DOWN] [TAB] [SHIFT UP]
```

- To skip a cell, use the corresponding key twice. For example, to move RIGHT to alternate cells, you must enter

```
[TAB] [TAB]
```

## How do I paste data in an application and move to the next item?

Most applications support the keyboard shortcut Ctrl+V to paste data that has been copied to the clipboard. To paste the data using the keyboard, follow these steps:

1. Ensure that the cursor is in the correct cell in a table, or in the correct control in a browser page, etc.
2. Type Ctrl+V. To simulate Ctrl+V in Automation Anywhere, use: [CTRL DOWN]v[CTRL UP].

These keystrokes will paste the data in your application.

3. Use the following examples as a guide in how to move to the next record or cell in your application using the keyboard:
  - Use the TAB key to move from a highlighted link to the next link in an Internet Explorer web page.
  - Use the [RIGHT ARROW] to move to the next cell in the same row in a Microsoft Word table.
  - Some applications also support using the Space bar to move to the next control or button.

## How do I create time stamps for files using Automation Anywhere system variables?

Automation Anywhere provides the following system variables that you can use to append time stamps:

- Year
- Month
- Day
- Hour
- Minute
- Second
- Date

You can combine these variables to create a custom time stamp.

Examples:

- To append Year, Month, and Day at the end of ABC, you can use:

```
ABC$Year$$Month$$Day$
```

- To create a complete time stamp with date and time, you can use:

```
ABC$Year$$Month$$Day$$Hour$$Minute$$Second$
```

- You can also include text characters between the variables, for example:

```
ABC$Year$-$Month$-$Day$
```

- To configure your own format for the Date variable, click on the Tools menu and select Variable Manager. Click on System Variable and then Date. If you use the Date variable to append a date to file names, be sure no slashes (/) or commas (,) exist in the date format, because file names in Windows might not use the / or , characters.

## What is the recommended way to open an application as part of a task?

The recommended methods for opening an application in a task include:

- When you record a task, double-click the application icon on the desktop.
- Click on the Start menu, and then Programs. Select the application.

If the location of these icons change, resulting in an error when the task runs, follow these recommendations:

1. Open the task in the Task Editor.
2. Select the actions that involve navigating to menu items and clicking. They might involve several mouse moves and mouse clicks.

3. Delete these actions.
4. Replace them with single-line commands that you create by double-clicking the Open Program/File command and specifying the path to the application. The Open Program/File dialog includes a text box in which you can type parameters that Automation Anywhere can pass to the application.
5. The task can now open your application, regardless of where the icon is located.

## Logging into Windows when Application Paths Change

Occasionally, the application path for your Automation Anywhere tasks might require changing. For security reasons, you can set the Windows Login option in Advanced Settings to change the application path of your tasks.

Follow the steps given below:

1. Go to Tools > Options > Advanced Settings
2. Select the Application Path check-box if un-checked.
3. Click on the browse button



- The Windows Login command window is invoked:



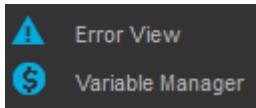
1. Enter these parameters:
  - Username: Enter the user name you created in User Accounts. [Schedule](#)
  - Password: Enter the password that is associated with your user account.
  - Domain Name: Specify the domain name. If not specified, the Windows Login uses the computer's domain name.

The new application path takes effect after you restart Automation Anywhere.

## Using the Error View

Task Editor provides two options for viewing and fixing task errors and working with task variables.

The Automation Anywhere To activate the Error View and the Variable Manager, click on these links:



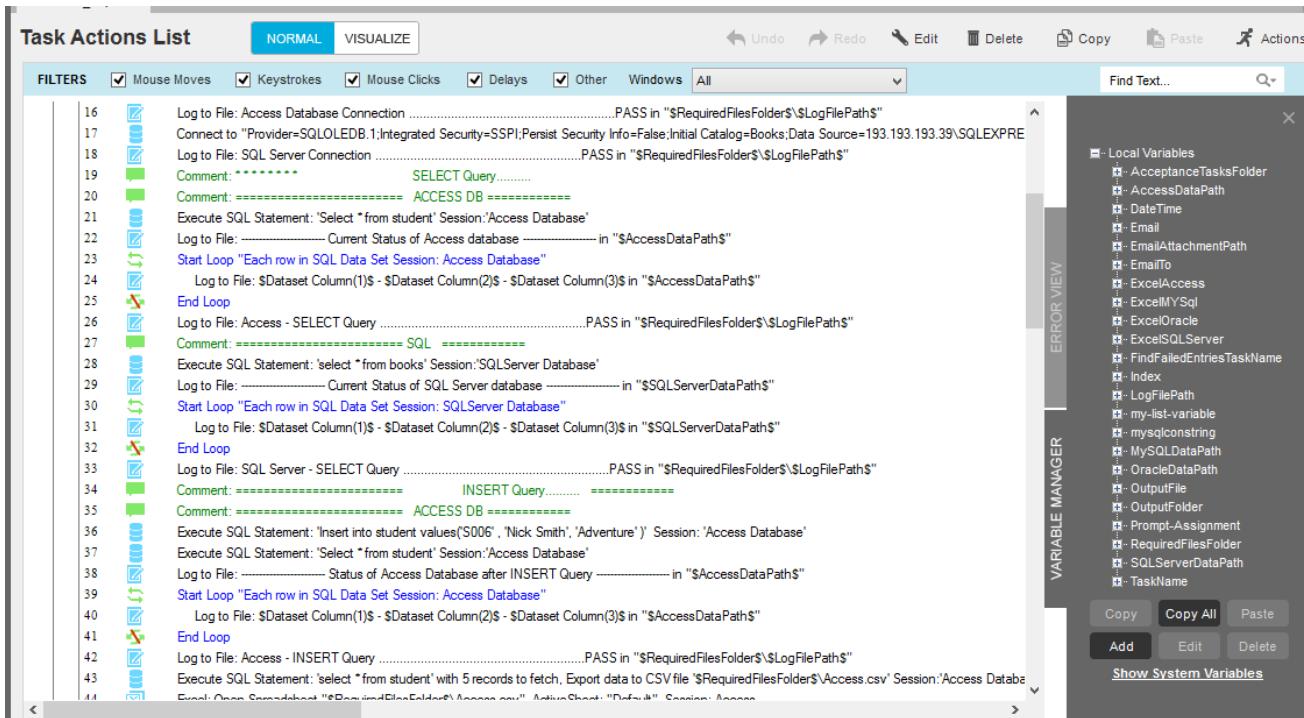
### Error View

Use the Error View to manage errors that occur in your tasks. This view is automatically updated when the Error Handling feature is used.

The screenshot shows the Task Editor interface with the 'Task Actions List' tab selected. On the left, the 'Task Actions List' pane displays a sequence of actions numbered 1 to 29, including IF statements, variable operations, and error handling blocks. On the right, the 'ERROR VIEW' pane shows a hierarchical tree of error handlers, each with its status (Fail or Pass) and associated actions like Continue, Take Snapshot, and Send Email. The 'VARIABLE MANAGER' pane is also visible at the bottom right.

### Variable Manager

Use the Variable Manager to create and manage variables that you use in your tasks. You can add, edit, or delete local (user-defined) variables.



## Variable Watch Table

Use the Variable Watch Table to track the values of your variables. The Variable Watch Table is enabled when you enable Debug Mode by clicking on the Enable Debugging link.

You can move the Variable Watch Table, as well as expand it as required.

To view how variables dynamically change, click the Add or Remove buttons. You can view both user-defined variables and system variables.

Use the Variable Watch Table as part of your debugging process.

Variable(s) Watch Table	
Name	Value
<input type="checkbox"/> Second	9
<input type="checkbox"/> Table Column(1)	
<input type="checkbox"/> TotalRAM	3992
<input type="checkbox"/> Trigger Value	
<input type="checkbox"/> XML Data Node(1)	
<input type="checkbox"/> Year	2014
<input type="checkbox"/> Select All	<b>Add</b> <b>Remove</b>

Related reference

[Logging into Windows when Application Paths Change](#)

## Resolve File and Folder trigger issues

**11.3.3** Use a settings based monitoring mechanism to resolve file and folder based trigger issues when the connection to the remote server hosting the folder/file is lost.

The monitoring mechanism informs you about a connectivity issue and allows you to reconnect automatically to the Enterprise Control Room server when using triggers for files and folders.

Update the AASettings.xml file to include two properties - folderwatcherretryintervalinseconds and folderwatcherretrycount in the EventWatcher node.

### Procedure

1. Go to the Automation Anywhere Enterprise client application path.
2. Open the AASettings.xml file in administrator mode.
3. Add the following properties under the Eventwatcher node as shown in the code.

```
<EventWatcher>
<options>
<folderwatcherretryintervalinseconds>10</folderwatcherretryintervalinseconds>
<folderwatcherretrycount>4</folderwatcherretrycount>
</options>
</EventWatcher>
```

Tip: The figures given in the code are illustrative.

- a) folderwatcherretryintervalinseconds - time allowed between reconnection attempts in seconds. Minimum value allowed is 0 seconds and maximum value allowed is 1800 seconds.
- b) folderwatcherretrycount - number of attempts allowed to reconnect to the server. To stop monitoring the retry attempts, set the value to 0 and to monitor continuously set the value to either -1 or leave it blank.

4. Save the file.

### Next steps

Run the EventWatcher application from the application path to monitor the connectivity issue.

# Using Bot Insight

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 leverages the large amount of content-level and productivity data that the deployed bots generate, touch, interact with, and process. It translates the data captured by the deployed bots into insights through auto-generated and customizable dashboards.

Bot Insight is available with out-of-the-box dashboards that you can start using instantly. These dashboards provide analysis to measure the performance of your digital workforce and predict and solve preventable business problems. Bot Insight provides two types of analytics:

- Operational Analytics
- Business Analytics

- **Roles**

Automation Anywhere Enterprise restricts access to Bot Insight to users with certain roles. Access to the Bot Insight dashboards depends on whether you are accessing it from the Enterprise client or Enterprise Control Room.

- **Role-Based Access Control**

Role-based Access Control (RBAC) enables a Enterprise Control Room administrator to restrict access to the various components of the Automation Anywhere Enterprise solution and folders that contain tasks.

- **Operational Analytics**

Operational analytics provide analysis about the performance of your digital workforce. You can use this analysis to know about the performance of a bot, status of tasks, past and upcoming schedules of tasks, audit information, utilization of various resources, workload status, and health of the machine on which the tasks are running.

- **Business Analytics**

Business analytics provides 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, and quote to order ratio.

- **How Business Analytics works**

Bot Insight processes the data collected by the deployed bots to provide meaningful insights in the form of business analytics.

- **Configuring a task for business analytics**

To configure an automation task for business analytics, you need to 'instrument the task' by enabling analytics and tagging the variables that are of interest for data analysis.

- **Running the task and analyzing data**

You need to run the task that you have configured for business analysis and analyze the data.

- **Viewing a dashboard**

You can view a Bot Insight dashboard from both the Enterprise client and Enterprise Control Room.

- **Customizing a dashboard**

Bot Insight enables a user with the `AAE_Bot_Insight_Expert` role to customize the information displayed on a system-generated dashboard to make it more relevant for an analytics consumer.

- **Center of excellence dashboards**

The Center of Excellence (CoE) dashboard displays interactive metrics for your organization's RPA projects. It provides information that helps CoE teams to gauge the value delivered by their RPA program.

- [Bot lifecycle management](#)

The Automation Anywhere Bot Lifecycle Management (BLM) utility 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.

- [Bot Insight APIs](#)

An application Programming Interface (API) allows other applications to connect with Automation Anywhere Enterprise and fetch the required data.

- [Bot Insight FAQs](#)

Common questions and answers about Bot Insight.

- [Configuring ports for Zoomdata](#)

Information about configuring the default and custom ports in Bot Insight for Zoomdata connectivity.

- [Troubleshooting](#)

Information about troubleshooting various issues and errors related to Bot Insight dashboards.

## Roles

Automation Anywhere Enterprise restricts access to Bot Insight to users with certain roles. Access to the Bot Insight dashboards depends on whether you are accessing it from the Enterprise client or Enterprise Control Room.

Bot Creators can access the analytics dashboard for a task from both the Enterprise client and Enterprise Control Room. 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 Operational and Business Analytics dashboards:

- Bot Insight Admin
- Bot Insight Expert
- Bot Insight Consumer
- AAE COE Admin

### 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 data in the dashboards that are deployed in the production environment.
- Bookmark, compare, and share the dashboards.

## Role-Based Access Control

Role-based Access Control (RBAC) enables a Enterprise Control Room administrator to restrict access to the various components of the Automation Anywhere Enterprise solution and folders that contain tasks.

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.

### Role-Based access control for operational analytics

RBAC for operational analytics is deny-all and allow by exception based on the roles and domains. Two levels of checks are applied to access the operational analytics data. First, you must be a member of a role that has access to view the operational analytics in the Enterprise Control Room. Next, if you have access, you can only view the bots belonging to your departments.

An Admin user can assign various permutations and combinations of access levels to different sets of users and roles based on the business need.

Dashboards for Operational Analytics are available in the DASHBOARDS tab in the Enterprise Control Room. The DASHBOARDS tab contains the following dashboards:

- Home
- Bots
- Devices
- Audit  
Note: The Audit dashboard is visible only if the role assigned to a user has permission to view audit logs.
- Workload
- Insights

### Role-based access control for business analytics

Dashboards for business analytics are available for the tasks that are enabled for analytics. The Enterprise Control Room administrator and users that have access to a task can view the dashboards for those tasks. Users 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 Enterprise client.

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 access to them to the Sales folder. The same applies to grant access to the accounts-related tasks in the Accounts folder.

The following table illustrates the access the various members of the Sales and Accounts team will have:

		Sales_Dep			Accounts_Team	
		John	Mark	Dave	Smith	Micheal
Access to the Sales folder		Yes	Yes	Yes	No	No
	Sales1	Yes	Yes	Yes	No	No
	Sales2	Yes	Yes	Yes	No	No
Access to the Accounts folder		No	No	No	Yes	Yes
	Accounts1	No	No	No	Yes	Yes
	Accounts2	No	No	No	Yes	Yes
	Accounts3	No	No	No	Yes	Yes

## Operational Analytics

Operational analytics provide analysis about the performance of your digital workforce. You can use this analysis to know about the performance of a bot, status of tasks, past and upcoming schedules of tasks, audit information, utilization of various resources, workload status, and health of the machine on which the tasks are running.

Operational analytics provides real-time and historical information about the health and performance of the deployed bots and machines. This actionable intelligence enables operations managers and practitioners to constantly monitor the efficiency and effectiveness of their digital workforce.

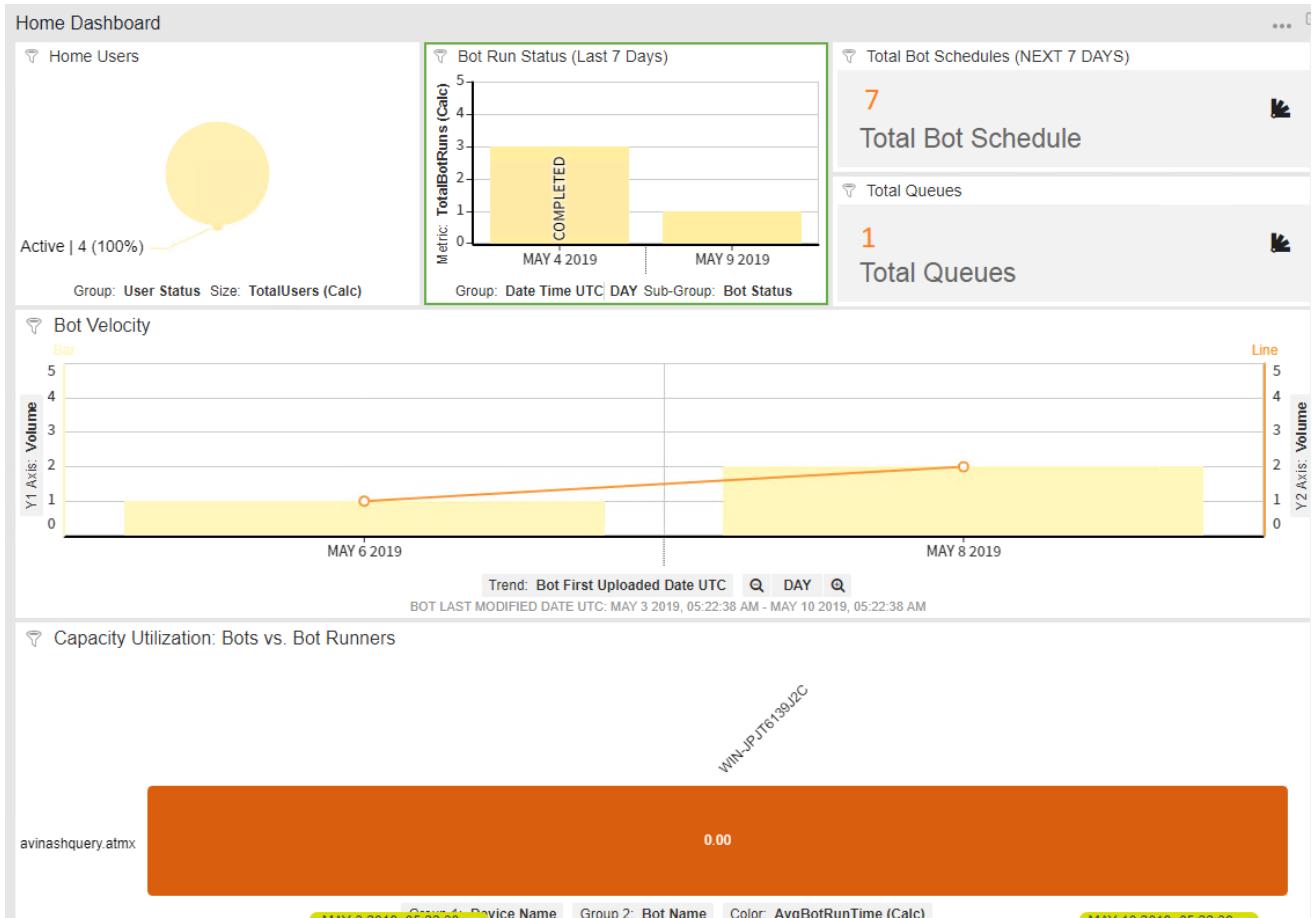
Operational analytics provides information about active users, registered clients, failed tasks, past and upcoming schedules, workflows, and utilization of resources on devices. These dashboards help you to take business decisions regarding the scaling of your digital workforce and take any corrective actions to address an issue. The following dashboards are available

- Home
- Bots
- Devices
- Audit
- Workload
- Insights

### Home dashboard

The Home dashboard displays various widgets that provide information such as the number of active users, number of bots scheduled for the next 7 days, bot velocity, and capacity utilization of the bot runner

machine.



**Home Users:** Displays information about the total number of active users in the Enterprise Control Room.

**Bot Run Status:** Displays information about the status of a bot for the last seven days.

**Total Bot Schedules:** Displays information about the total number of bots that have been scheduled for the next seven days.

**Total Queues:** Displays information about the total number of active queues.

**Bot Velocity:** Displays information about the trend of the bots that were built and uploaded on the Enterprise Control Room.

**Capacity Utilization:** Displays information about the distribution of bots across various devices. You can use this widget to identify the machines that are used more and distribute bots across other machines that are less utilized.

## Bots dashboard

The Bots dashboard displays various widgets that provide information about deployed bots such as bots consuming most resources, bots scheduled to run, bots that failed to run, and status of bots.



**Bots Heartbeat:** Provides a statistical representation of the relationship between the failure score of a bot and the respective bot. A failure score is a calculation of the resource utilization when you run a bot. The formula for calculating the failure score is:

$$\text{Failure score} = (0.5 \times \text{Memory usage}) + (0.3 \times \text{CPU usage}) + (0.2 \times \text{HDD usage})$$

**MVP bot:** Provides information about the bots with maximum processing times and the number of times they run.

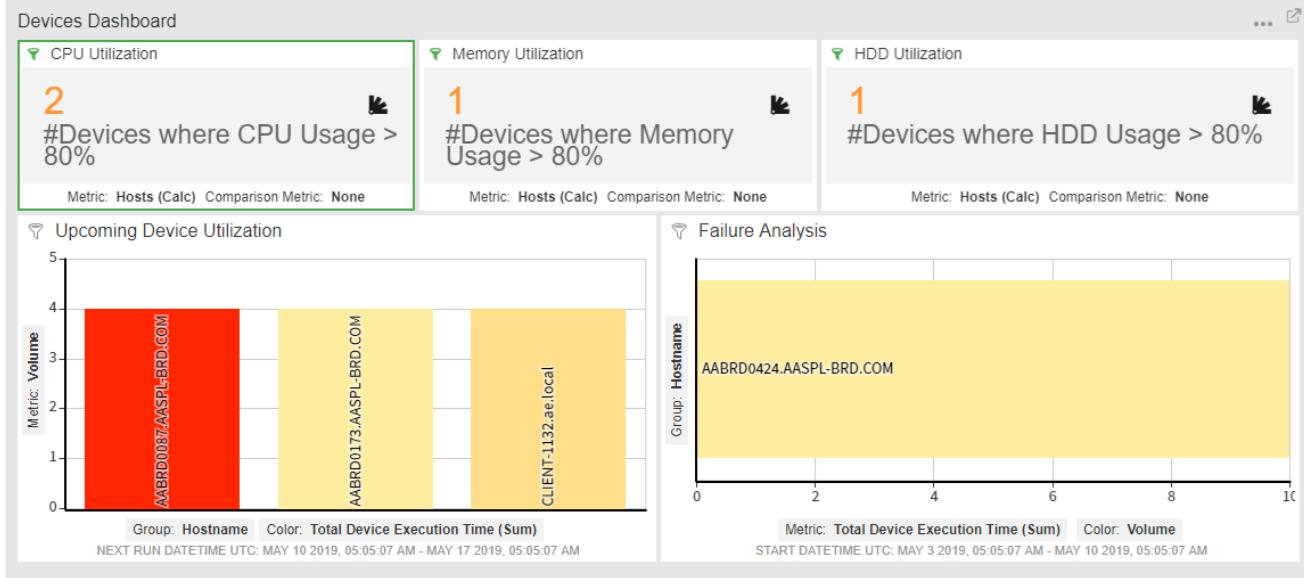
**Bot Status:** Provides information about the status of the bots that were executed.

**Top Failure Reasons:** Provides information about the errors the deployed bots encounter. The errors are categorized into various groups and the number of errors for each group is displayed.

**Upcoming Schedules:** Provides information about all the bots that are scheduled to run.

## Devices dashboard

The Devices dashboard displays various widgets that provide information about the resource utilization of the machines on which the bots are executed.



**CPU Utilization:** Provides information about the number of devices that have crossed the threshold utilization of CPU on which the bot is executed for a specific period.

**Memory Utilization:** Provides information about the number of devices that have crossed the threshold utilization of memory on which the bot is executed for a specific period.

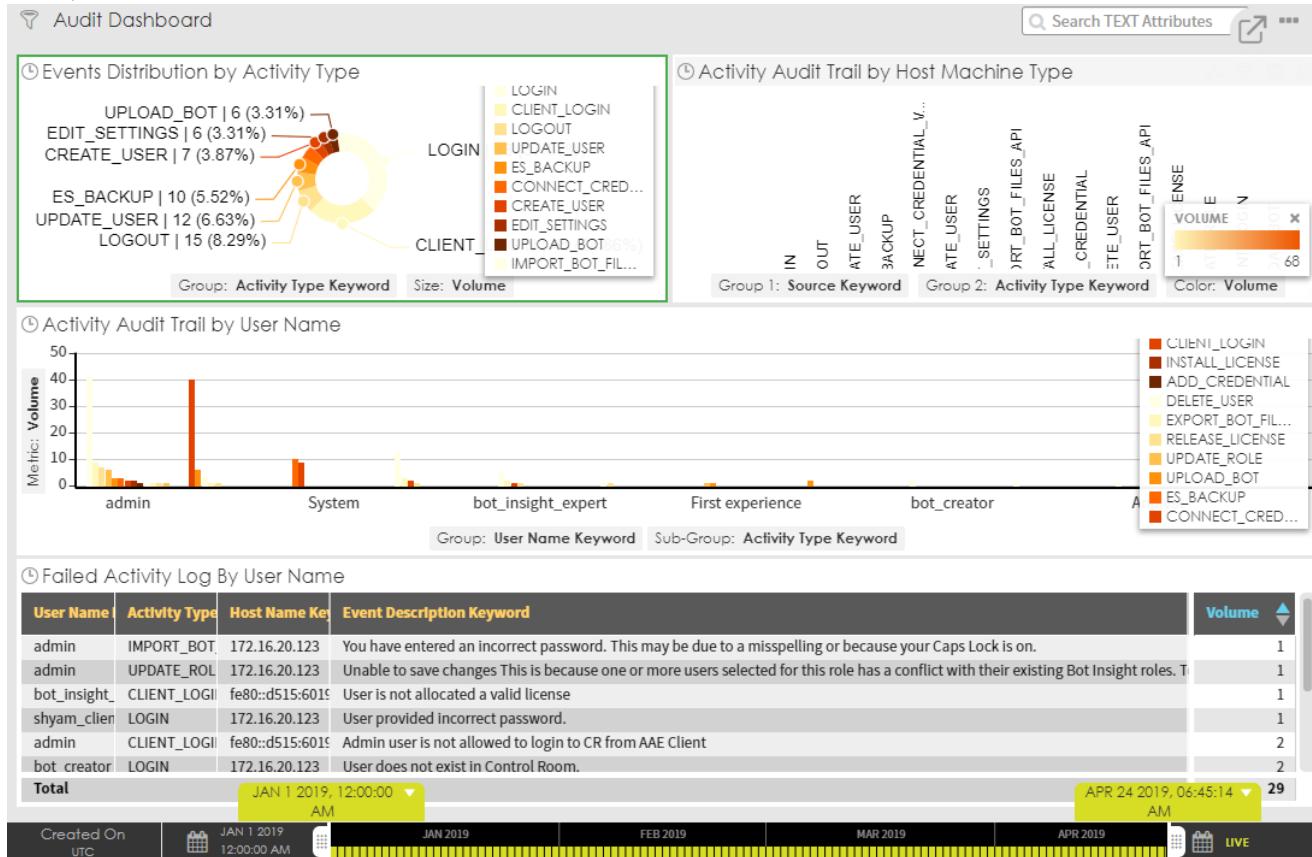
**HDD Utilization:** Provides information about the number of devices that have crossed the threshold utilization of the hard disk space on which the bot is executed for a specific period.

**Upcoming Device Utilization:** Provides information about the number of devices on which automation are scheduled to run.

**Failure Analysis:** Provides information about the devices with the maximum number of failures for a specific period.

## Audit dashboard

The Audit dashboard displays various widgets that provide information about various events performed in the Enterprise Control Room.



Note: You can view this dashboard only if the role assigned to you has the permission to view audit logs. See [Role-Based Access Control](#).

**Events Distributed by Activity Type:** Provides information about the activities performed within a specific period. The activities are filtered based on the Action Type column in the Audit Log page.

**Activity Audit Trail by Host Machine Type:** Provides information about the activities performed within a specific period. The activities are filtered based on the Source column in the Audit Log page.

**Activity Audit Train by User Name:** Provides information about the activities performed by a user within a specific period.

**Failed Activity Log by User Name:** Provides information about the failed activities for a user within a specific period.

## Workload dashboard

The Workload dashboard provides information about the status of device pools, queues, and work items in the Executive dashboard tab and the Operation Manager's dashboard tab. The Executive dashboard tab enables you to monitor the progress of the queues for which you are an owner or a consumer. The

Operation Manager's tab enables you to monitor the queues for which you are an owner, consumer, or participant.

## EXECUTIVE DASHBOARD

Device pools by backlog: Provides information about the device pools by backlog. The device pool backlog is measured as the time required to complete the existing work item from all automation tasks in that pool. You can adjust the device pool size or reorder the automation tasks as per your requirement.

Queues by time to complete: Provides information about the list of queues ordered by time to complete. Time to complete is measured as the time required to complete the existing work items. You can pause or change the priority of an automation task. You can click an individual queue to view details such as queue name, number of open items, average processing time, and expected time to complete.

Queue status: Provides information about the queues that are processed in the last 7 days. The status for the work items of each queue is displayed and enables you to monitor the progress of your workload items.

Queue with average processing time: Provides information about the queues that were processed in the last 7 days with the average processing time. The queues listed are based on the average processing time for a work item compared to a daily average.

## OPERATION MANAGER'S DASHBOARD

Device pools by FTE: Enables you to view pools in descending order of Full Time Equivalent (FTE). This allows you to evaluate the value of each pool in the equivalent manual effort required to process the same work item.

Pools by decreasing error rate: Enables you to view pools ordered by decreasing error rate and enables you to identify the pools that require attention. The error rate is calculated as the number of work items with an error by the number of work items processed from that pool.

Device pools by backlog: Provides information about the device pools by backlog. The device pool backlog is measured as the time required to complete the existing work item from all automation tasks in that pool. You can adjust the device pool size or reorder the automation tasks as per your required.

Queues with average wait time: Enables you to view the list of queues that are processed in the last 7 days with the average wait time. This helps you to decide whether to increase the priority or pool size as per your business needs. The wait time is calculated by subtracting the processing start time from the automation start or resume time.

Queues by decreasing error rate: Enables you to view the list of queues ordered by decreasing error rate and helps you identify the queues that require attention. The error rate is calculated as the number of work items with error divided by the number of work items processed from that pool.

## Insight dashboard

This pane provides a link to the open dashboards for business analysis in a new window. The dashboards are generated for each task for which variables are tagged and enabled for analytics.

## Business Analytics

Business analytics provides 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, and quote to order ratio.

The system automatically generates a Bot Insight dashboard when you tag variables for analytics in a task and run that task. The dashboard generated is of the same name as the tasks. System-generated and customized dashboards are available for business analytics.

System-generated dashboards are the dashboards that the system automatically generates for the tasks that are enabled for analytics. The system-generated dashboards are available in the Configure tab in the Bot Insight window.

Customized dashboards are the system-generated dashboards that you have customized based on your needs. The customized dashboards can be published and are available in the Analyze tab in the Bot Insight window.

## How Business Analytics works

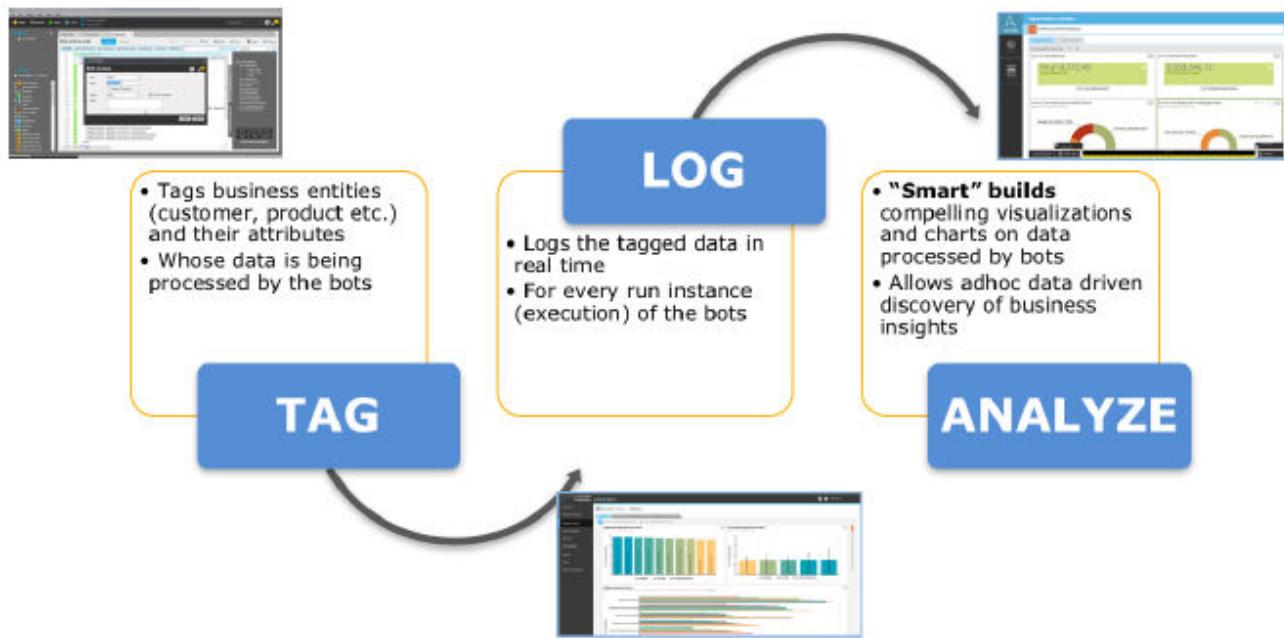
Bot Insight processes the data collected by the deployed bots to provide meaningful insights in the form of business analytics.

You need to identify the tasks for which you want to generate the analytics. After you have identified the required tasks, do the following:

Step 1: Enable a task for analytics and tag the required variables in the task to enable the bot to collect data for analytics.

Step 2: The bot logs the data from the tagged variables every time a task runs.

Step 3: Use the auto-generated or customized dashboard to analyze the data and obtain meaningful insights.



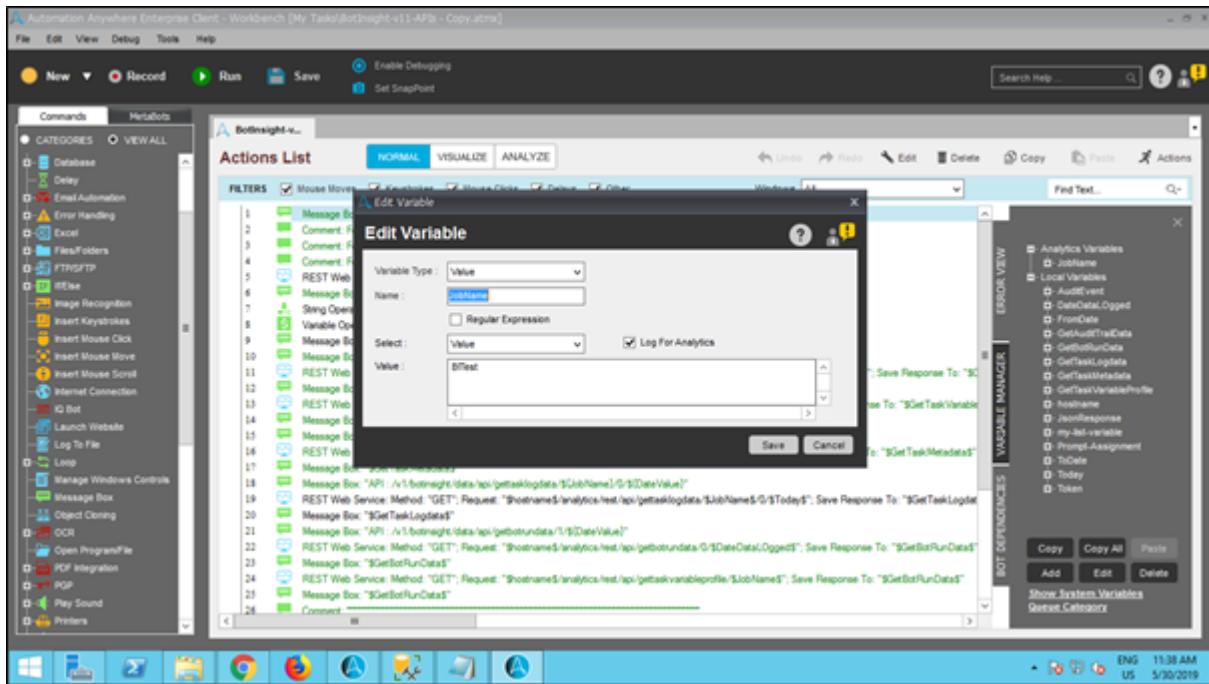
## Configuring a task for business analytics

To configure an automation task for business analytics, you need to 'instrument the task' by enabling analytics and tagging 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 client.  
Note: You must have Bot Creator license assigned to you.
2. In the Task pane, select the folder that contains the task for which you want to enable analytics.  
The tasks available in the selected folders appear in the center pane.
3. Select a task from the My Tasks pane.
4. Click Analytics in the Properties tab, and then select the Enable Analytics for this task option.
5. Click Edit on the toolbar.  
The system opens the task in the Workbench window.
6. Click the VARIABLE MANAGER tab on the right of the window.  
The variables used in the task appears in the tab.
7. Select the variable you want to tag for analytics, and then click Edit at the bottom of the tab.  
The Edit Variable dialog box appears.
8. Select the Log For Analytics option, and then click Save.



You can repeat step 7 and step 8 to tag more variables from the same task.

You can also add a new variable to an existing task and tag that variable for analytics. Newly added variables need to be made available for analysis and usage within existing custom dashboards that have been previously created against that task. When you are adding a variable to the task, you must select the Log For Analytics option.

## Running the task and analyzing data

You need to run the task that you have configured for business analysis and analyze the data.

### Prerequisites

Enable the task for analytics. See [Configuring a task for business analysis](#).

To run a task and analyze the data, do the following:

### Procedure

1. Select the task you have enabled for business analytics in the Enterprise client.
2. Click Edit on the toolbar.
3. Click Run on the toolbar.
4. After the task is completed, click the ANALYZE tab.  
The Bot Insight dashboard for the selected task appears.
5. You can click the Data Profile tab to view data available for each variable that is tagged for analytics.
6. You can click the Rank option to view the statistical distribution of the data row for the values of each variable.

- 
7. You can click the Dashboard tab to view the KPIs, donut charts, and timeline charts.  
You can use the data filter slider to specify the period for which the information is displayed on the dashboard.

Default attributes of a widget

Each widget available in a dashboard contains the following attributes:

- Machine Name: The name of the machine on which the automation task ran.
- Run date: The date when the automation task ran.

These default attributes are available along with other variables that are tagged for a task for analytics.

## Viewing a dashboard

You can view a Bot Insight dashboard from both the Enterprise client and Enterprise Control Room.

To view a Bot Insight dashboard from the Enterprise Control Room, do the following:

### Procedure

1. Log in to the Enterprise Control Room with the `AAE_Bot_Insight_Admin`, `AAE_Bot_Insight_Expert`, or `AAE_Bot_Insight_Consumer` role.
  2. Select Insight from DASHBOARDS.
  3. Click the Open Bot Insight link.  
The Bot Insight dashboard appears in a new tab.
- [Viewing a dashboard from Enterprise client](#)  
You can view a Bot Insight dashboard from Enterprise client.

## Viewing a dashboard from Enterprise client

You can view a Bot Insight dashboard from Enterprise client.

To view a Bot Insight dashboard from the Enterprise client, do the following:

### Procedure

1. Log in to the Enterprise client with the Bot Creator license.
  2. In the Task pane, select the folder that contains the task that you want to enable for analytics.  
The tasks available in the selected folders appear in the center pane.
  3. Select a task from the My Tasks pane.
  4. Click Edit on the toolbar.  
The system opens the task in the Workbench window.
  5. Select a variable and click the ANALYZE tab.  
The Bot Insight dashboard for the selected task appears.
- Note: You may be prompted to log in with appropriate Bot Insight user role.

# Customizing a dashboard

Bot Insight enables a user with the `AAE_Bot_Insight_Expert` role to customize the information displayed on a system-generated dashboard to make it more relevant for an analytics consumer.

You cannot directly customize the Business Insight dashboards. To make changes in a Business Insight dashboard, you must create a copy of the dashboard and then update the copy.

- [Editing a dashboard widget](#)

You can edit the properties of a widget in a dashboard based on your requirements. There are numerous options available to do so, such as using Chart Filters, Chart Style, Metric-based filters, and Comparison Metrics

- [Editing data profile](#)

You can modify the data profile of a dashboard without making any changes to the bot. 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 datatype, and exclude it from the 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 further 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 the data populated in customized 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 gets populated in the dashboard.

- [Publishing a business analytics dashboard](#)

You must publish a business analytics dashboard generated for a task.

- [Uploading task on Enterprise Control Room for deployment](#)

You must upload a task to the Enterprise Control Room to make it available for deployment on a Bot Runner machine and ready to be scheduled and run on a regular schedule.

- [Running the analytics task from Enterprise Control Room](#)

After you have uploaded a task for analytics on the Enterprise Control Room, you can run that task and generate data for analytics.

- [Reviewing data in 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.

- [Bookmarking a dashboard](#)

You can bookmark the dashboards you view frequently for quick and easy access. The dashboards you have bookmarked are available for your individual use only.

- [Saving a dashboard](#)

You can save a copy of a 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 appear side-by-side, which enables you to obtain more insights.

- [Deleting a dashboard](#)

You can delete a user-created dashboard using the Delete option.

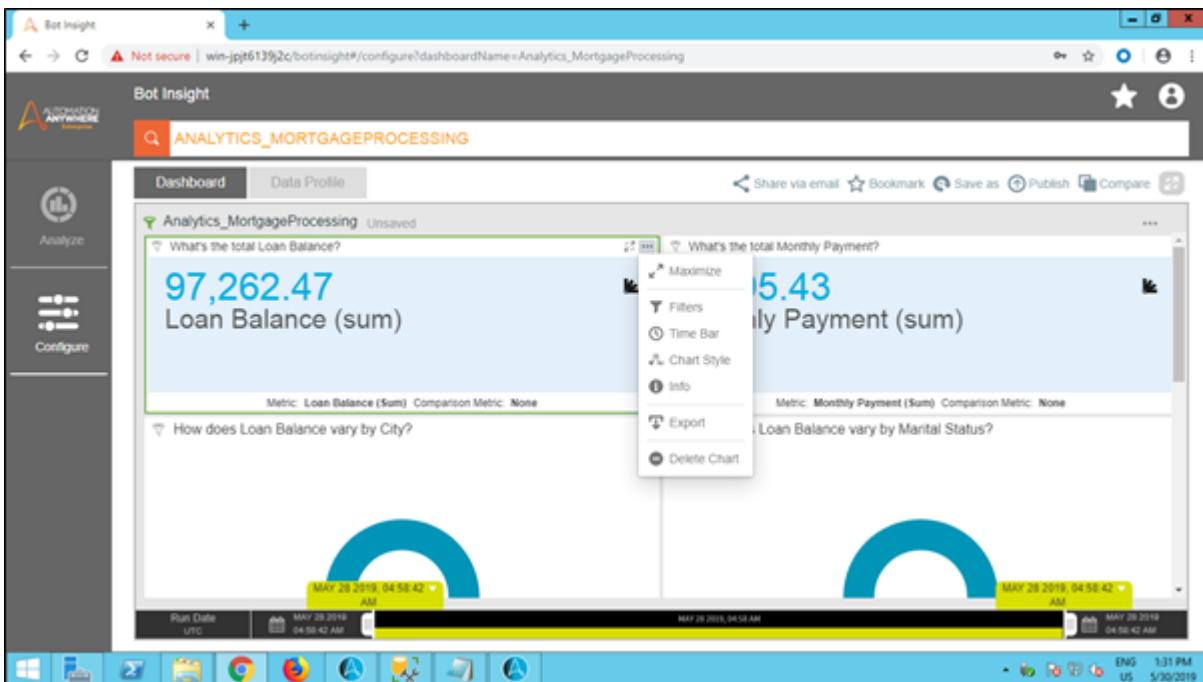
## Editing a dashboard widget

You can edit the properties of a widget in a dashboard based on your requirements. There are numerous options available to do so, such as using Chart Filters, Chart Style, Metric-based filters, and Comparison Metrics

To edit a widget in a Bot Insight dashboard, do the following:

### Procedure

1. Open the dashboard for which you want to edit the widget.
2. Click the  on the top-right of the widget that you want to edit.  
The following options are available on the menu:
  - Chart Filters: Select this option to add filters on the chart.
  - Chart Style: Select this option to change the chart style and its settings.
  - Delete: Select this option to delete the widget from the dashboard.
  - Active Filter: Select this option to apply row-level filters. You can create a new filter or apply a saved filter.



3. You can click the bottom of a widget to change the attribute of the chart displayed within the widget.
4. Click Save As, specify a name for the updated dashboard in the Name field, and then click Okay.

## Editing data profile

You can modify the data profile of a dashboard without making any changes to the bot. 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 datatype, and exclude it from the dashboard.

To edit the data profile of a dashboard, do the following:

## Procedure

1. Open the dashboard for which you want to edit the data profile.
2. Click the Data Profile tab.
3. Click Edit at the bottom-right of the window.
4. You can specify a new name for a variable in the Display Name field.
5. You can select an option from the Datatype 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.
6. You can clear the Inclusion check box to exclude the variable from the dashboard. This enables you to include or exclude a variable from the dashboard and configure how the initial SMART dashboard is generated.
7. You can view the Minimum, Maximum, Average, Sum, and Last Value for the numeric values, but not for the string and timestamp variable types.
8. Click Save and Generate Dashboard to save the changes and generate the dashboard with the updated values.

Variable Name	Display Name	Datatype	Inclusion	Minimum	Maximum	Average	Sum	Distinct Count
City	City	String	<input type="checkbox"/>					Rank
LoanBalance	Loan Balance	Numeric	<input checked="" type="checkbox"/>	97,262.50	97,262.50	97,262.47	97,262.47	1
LoanDueDate	Loan Due Date	Timestamp	<input checked="" type="checkbox"/>			1970-01-01 00:00	1970-01-01 00:00	1
LoanOriginDate	Loan Origin Date	Timestamp	<input checked="" type="checkbox"/>			1970-01-01 00:00	1970-01-01 00:00	1
MaritalStatus	Marital Status	String	<input checked="" type="checkbox"/>					Rank
MonthlyPayment	Monthly Payment	Numeric	<input checked="" type="checkbox"/>	3,695.43	3,695.43	3,695.43	3,695.43	1
MortgageType	Mortgage Type	String	<input checked="" type="checkbox"/>					Rank
State	State	String	<input checked="" type="checkbox"/>					Rank

Save and Generate Dashboard      Cancel

## 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 further enhances your ability to verify that the data is logged correctly in the bot.

To view the ranking of values stored in a string variable, do the following:

## Procedure

1. Open the dashboard for which you want to edit the data profile.
2. Click the Data 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 pop-up message displays the top ten values that are logged for the maximum number of times in the variable.

4. You can select Bottom from the list to display the top ten values that are logged for the least number of times in the variable.
5. You can select an option from the list to display five or ten values in the pop-up.

## Previewing data

You can view all the variable data associated with a task using the Preview Data option.

To view the variable data, do the following:

### Procedure

1. Open the dashboard for which you want to preview the data.
2. Click the Data Profile tab.
3. Click the Preview data button. A new window appears displaying all the variable data associated with that task.

## Verifying the data populated in customized 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 gets populated in the dashboard.

To verify whether data is properly populated in a customized dashboard, do the following:

### Procedure

1. Open the task for which you want to verify the data in the Enterprise client.
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

You must publish a business analytics dashboard generated for a task.

To publish a dashboard, do the following:

## 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. The analytics consumers who primarily analyze and interpret data can access the published dashboard from the Analyze tab in the Bot Insight window.

## Uploading task on Enterprise Control Room for deployment

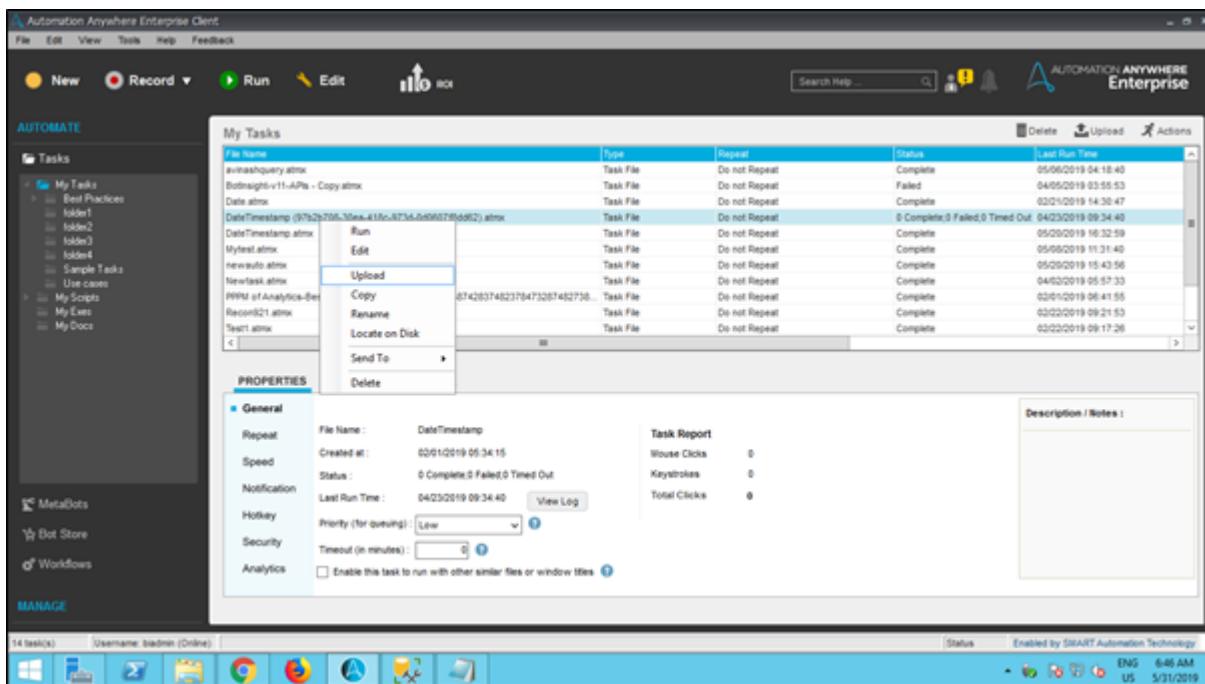
You must upload a task to the Enterprise Control Room to make it available for deployment on a Bot Runner machine and ready to be scheduled and run on a regular schedule.

To upload a task on Enterprise Control Room, do the following:

## Procedure

1. Log in to the Enterprise client.
  2. Select the folder from the Tasks pane that contains the task you want to upload.
  3. Select the task from the My Tasks section and click Upload on the toolbar.
- Or,

You can right-click the task and select Upload from the menu.



## Running the analytics task from Enterprise Control Room

After you have uploaded a task for analytics on the Enterprise Control Room, you can run that task and generate data for analytics.

When you run a task from the Enterprise Control Room, the data generated by the task is available for display on the published system-generated or user-defined dashboard associated to that task. See [Publishing a business analytics dashboard](#)

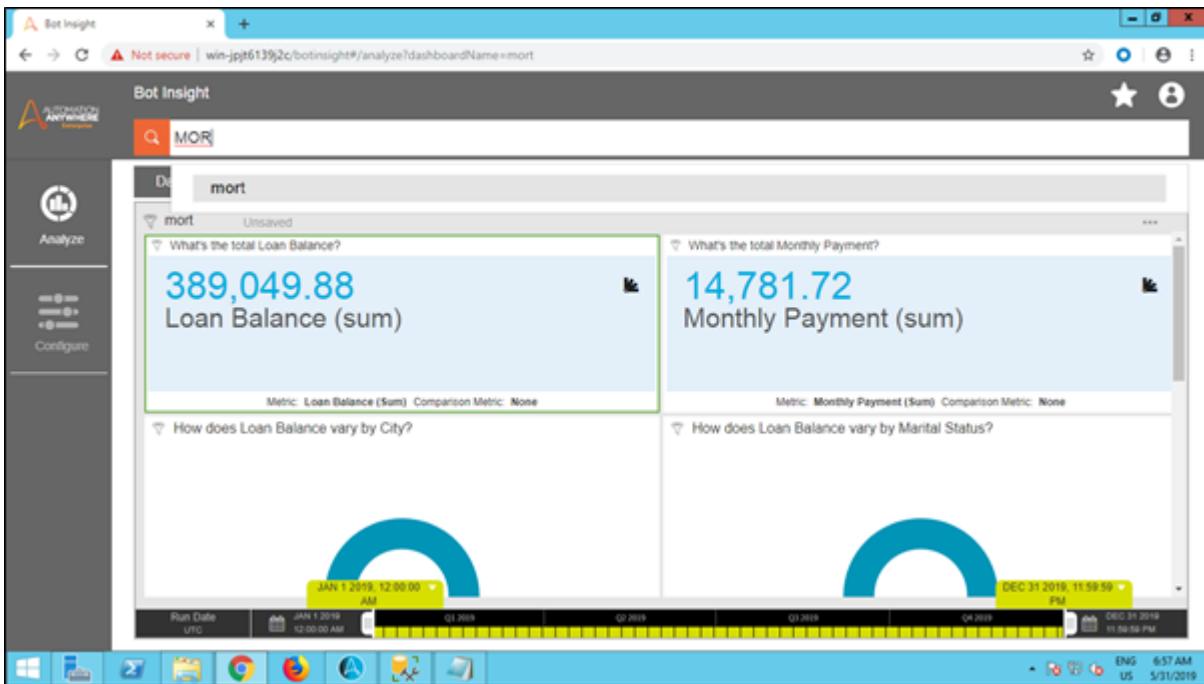
## Reviewing data in published dashboard

You can review the data available in a published dashboard.

To review the data in a published dashboard, do the following:

### 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. You can 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.

To share the link of a dashboard, do the following:

### 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.

## Bookmarking a dashboard

You can bookmark the dashboards you view frequently for quick and easy access. The dashboards you have bookmarked are available for your individual use only.

To bookmark a dashboard, do the following:

### Procedure

1. Open the dashboard that you want to bookmark.
  2. Click Bookmark on the toolbar.  
The bookmark indicator on the toolbar changes to indicate that the dashboard is bookmarked.  
Note: You can follow the same procedure to remove a bookmarked dashboard.
- [Viewing a bookmarked dashboard](#)  
Quickly and easily view the dashboards that are bookmarked.

## Viewing a bookmarked dashboard

Quickly and easily view the dashboards that are bookmarked.

To view a bookmarked dashboard, do the following:

### Procedure

1. Open the Bot Insight window.
2. Click the Star icon on the top-right of the window.
3. Select the dashboard you want to view from the Configure or Analyze tab.  
The selected dashboard appears.

## Saving a dashboard

You can save a copy of a dashboard.

To save a copy of a dashboard, do the following.

### Procedure

1. Open the dashboard for which you want to create a copy.
2. Click Save as on the toolbar.
3. Specify a name for the dashboard, and then click Okay.

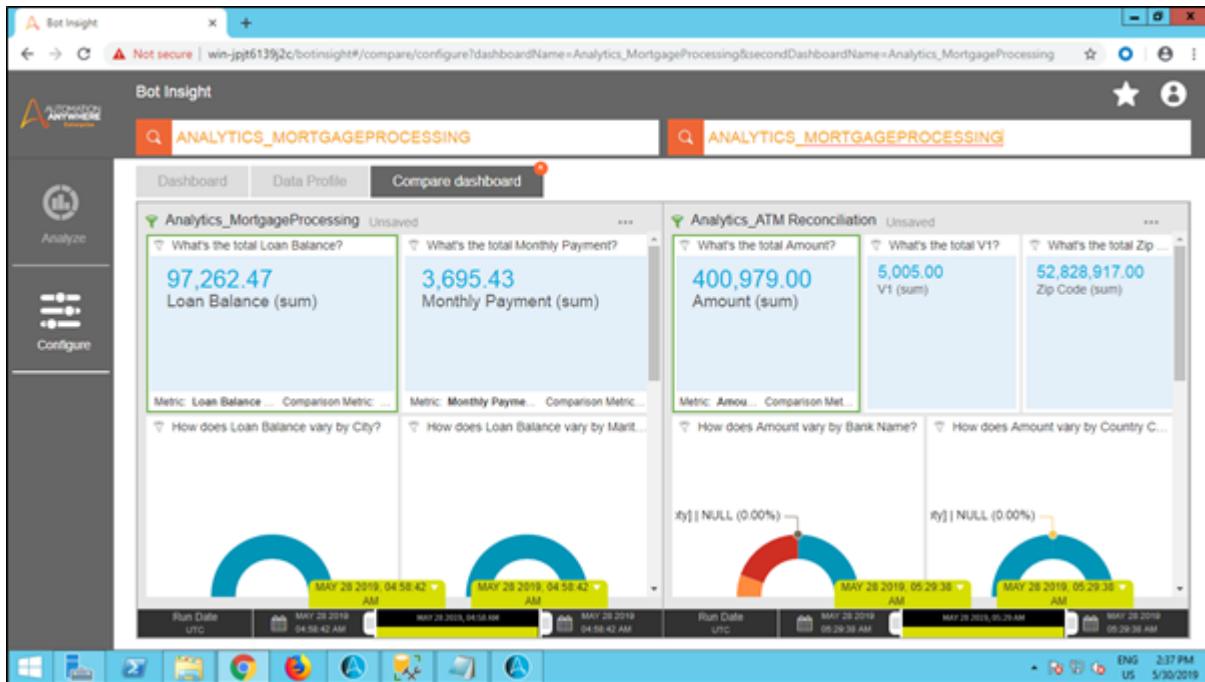
## Comparing dashboards

You can compare dashboards that belong to two separate processes or the same process with different filters. The dashboards selected for comparison appear side-by-side, which enables you to obtain more insights.

To compare dashboards, do the following:

### Procedure

1. Open the dashboard that you want to compare.
2. Click Compare on the toolbar.  
The Compare dashboard tab appears. The dashboard you have opened appears in the left section of the window.
3. In the right section of the window, search for the dashboard that you want to compare this dashboard with.
4. Select the dashboard from the search results.  
The dashboard appears in the right section. You can now compare the dashboards displayed in the left and right sections of the window. You can use all the features available in a dashboard apart from the Add widget option.



## Deleting a dashboard

You can delete a user-created dashboard using the Delete option.

To delete a customized dashboard, do the following:

### Procedure

1. Open the dashboard you want to delete.
2. Click Delete on the toolbar.
3. Click Okay.

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 tab of the Bot Insight window. The dashboards available in the Analyze tab are the published dashboard. Therefore, if you delete a dashboard from the Analyze tab, it will be no longer available for other users.

## Center of excellence dashboards

The Center of Excellence (CoE) dashboard displays interactive metrics for your organization's RPA projects. It provides information that helps CoE teams to gauge the value delivered by their RPA program.

The dashboard provides information about person-hours saved, total cost savings, cost savings per bot and per process, monthly bot ROI, and much more. This enables an organization to view information related to ROI from their RPA program immediately.

The CoE dashboard uses the existing bot run information from the Enterprise Control Room and automatically generates a default dashboard. You can customize the business information, such as process name, department name, hours saved per unit, money saved per unit, and generate a dashboard for each bot that has run till date. You can also add custom fields that you want to display along with the bot run data.

## Prerequisites

The following are the prerequisites required to access the CoE dashboards:

- Automation Anywhere Enterprise or later
- **AAE\_Bot Insight Admin** or **AAE\_COE\_Admin** role.
- All Bot Insight services should be running
- Bots must be deployed from Enterprise Control Room to Bot Runner devices
- Bot Insight's Business Analytics license
- [Viewing default CoE dashboard](#)  
If you satisfy all the prerequisites to access a CoE dashboard, you can log in to Bot Insight to view a default CoE dashboard.
- [Configuring a CoE dashboard](#)  
You can configure a CoE dashboard to specify how certain information is displayed. You can add or remove widgets, rearrange them and also change the default Business Information to reflect the correct metadata for your bot.
- [Adding business information to CoE dashboard](#)  
Apart from the default business parameters, you can add business information to a CoE dashboard based on your requirements. You can add information, such as the name of the Bot Creator, process owner, department head, production date, and so on.
- [Viewing business analytics dashboard from CoE dashboard](#)  
You can view all business analytics dashboards that are published for a bot when configuring a CoE dashboard.
- [Customizing CoE dashboard](#)  
You can add, delete, change visualization, apply filters, and do much more to customize a CoE dashboard.
- [Managing CoE dashboards across environments](#)  
The Import and Export functions in the CoE dashboard enables you to manage business information and customized CoE dashboards across different environments.
- [Publishing CoE dashboard](#)  
When you publish a CoE dashboard, it collects the Bot run data and merges it with the business information. The merged data is referred to as the CoE data source.

## Viewing default CoE dashboard

If you satisfy all the prerequisites to access a CoE dashboard, you can log in to Bot Insight to view a default CoE dashboard.

To view a default CoE dashboard, do the following:

## Procedure

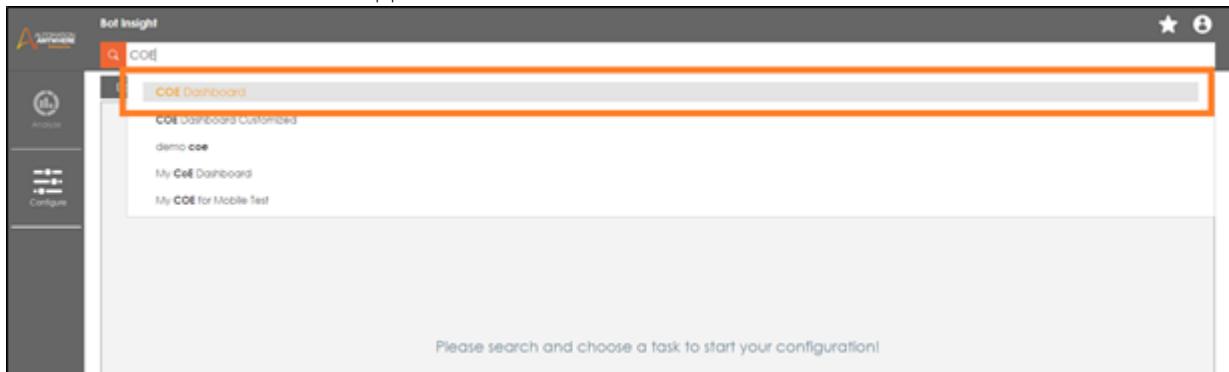
1. Open the Bot Insight window. See [Viewing a dashboard](#).
2. Click the Configure tab.

3. Search for the CoE dashboard.

The default CoE dashboard appears in the search results. The name of the dashboard is in orange color text.

4. Select the CoE dashboard that you want to view from the search results.

The selected CoE dashboard appears.



The default widgets appear after the dashboard is loaded. The default CoE dashboard merges the data processed by a bot in the last 30 days with the default business information. The default business information contains metadata such as process name, department name, hours saved, and money saved.

You cannot customize a default CoE dashboard. You can save a copy of the default CoE dashboard and then customize the saved copy of the default CoE dashboard. See [Sharing a dashboard](#).

- [Viewing a published CoE dashboard](#)

The published CoE dashboards are available in the Analyze tab in the Bot Insight window.

### Viewing a published CoE dashboard

The published CoE dashboards are available in the Analyze tab in the Bot Insight window.

To view a published dashboard, do the following:

### Procedure

1. Log in to Enterprise Control Room with the `AAE_Bot_Insight_Admin` role.
2. Click the Insight tab from the DASHBOARD.
3. Click the link to open the Bot Insight dashboard.
4. Click the Analyze tab.
5. Enter the name of the published dashboard in the Search field.
6. Select the dashboard that you want to view from the search results.

The CoE dashboard appears.

Note: Unlike other business dashboards, a published CoE dashboard shows the business information details in read-only mode.

## Configuring a CoE dashboard

You can configure a CoE dashboard to specify how certain information is displayed. You can add or remove widgets, rearrange them and also change the default Business Information to reflect the correct metadata for your bot.

Bot Name	Business Dashboard	Folder Name	Bot Display Name	Process Name	Department	Money Saved Per Unit	Hours Saved Per Unit	Units
Analytics_ATM Reconciliation	<a href="#">View</a>	.My Tasks/Sample Tasks	Analytics_ATM Reconciliation		Sample Tasks	100	10	Transaction Count
List-Variable	<a href="#">View</a>	.My Tasks/Sample Tasks	List-Variable		Sample Tasks	100	10	Per Hour
Variables	<a href="#">View</a>	.My Tasks/Sample Tasks	Variables		Sample Tasks	100	10	Per Hour
Analytics_MortgageProcessing	<a href="#">View</a>	.My Tasks/Sample Tasks	Analytics_MortgageProcessing		Sample Tasks	100	10	Transaction Count
Analytics_TelecomOrderEntry	<a href="#">View</a>	.My Tasks/Sample Tasks	Analytics_TelecomOrderEntry		Sample Tasks	100	10	Transaction Count
Files-Folders	<a href="#">View</a>	.My Tasks/Sample Tasks	Files-Folders		Sample Tasks	100	10	Per Hour
Variables_RBAC	<a href="#">View</a>	.My Tasks	Variables_RBAC		RBAC_Tasks	100	10	Per Hour
Variables_RBAC	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC		RBAC_Tasks	100	10	Per Hour
Copy of Variables_RBAC	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Copy of Variables_RBAC		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_new	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_new		RBAC_Tasks	100	10	Per Hour
Copy of Variables_RBAC_new	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Copy of Variables_RBAC_new		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_1	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_1		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_2	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_2		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_3	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_3		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_4	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_4		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_5	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_5		RBAC_Tasks	100	10	Per Hour
Variables_RBAC_6	<a href="#">View</a>	.My Tasks/RBAC_Tasks	Variables_RBAC_6		RBAC_Tasks	100	10	Per Hour

The Business Information tab displays the following information:

- Bot Name: Name of the bot.
- Business Dashboard: Provides the View option that enables you to view the published business dashboards for the bot. Administrators and RPA sponsors can easily view all the published dashboard and get an insight about the transactions the bot has processed. See [Viewing business analytics dashboard from CoE dashboard](#)
- Folder Name: Location where the bot is stored on the Enterprise client machine.
- Bot Display Name: Enables you to specify a name that will be displayed instead of the original name of the bot that displays in the Bot Name column.
- Process Name: Enables you to specify the name of the process for which the bot is created. For example, invoice processing, order to cash, account reconciliations, and so on.
- Department: Enables you to specify the name of the department for which the bot is created. For example, human resource, finance, sales, and so on.
- Money Saved Per Unit: This is a numeric field that displays the money saved per unit per bot. The default value for this field is set to 100. (This can be measured as the currency in which your organization operates). This field is editable and can be updated. You can specify the amount of money saved when you run the bot once in the production environment. You must update the value as and when you add more functionality to the bot to reflect the latest savings.
- Hours Saved Per Unit: This is a numeric field that displays the hours saved per unit per bot. The default value for this field is set to 10 hours. This field is editable and can be updated. You can specify the number of hours saved when you run the bot once in the production environment. You must update the value as and when you add more functionality to the bot to reflect the latest savings.
- Units: Select an option from the list to specify how to calculate ROI for a bot.

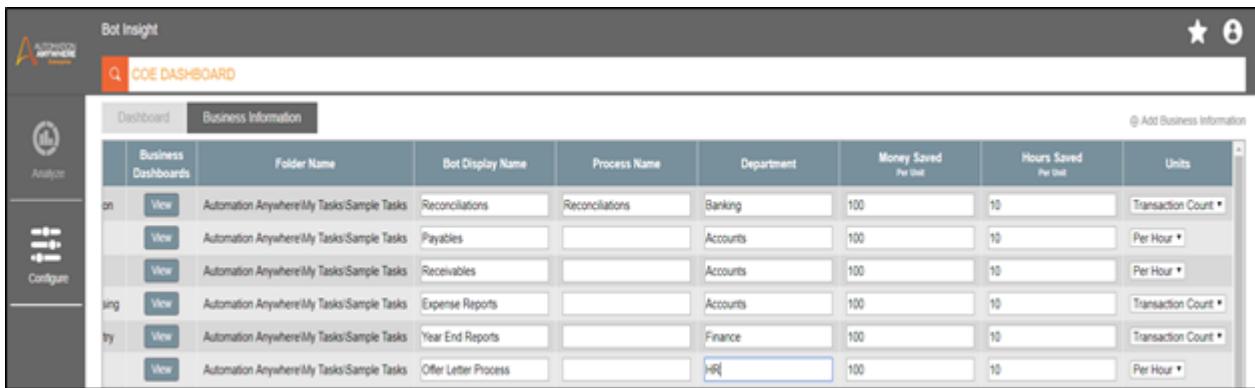
Following options are available:

- Per Hour: This option calculates the ROI based on the time the bot runs.

- Transaction Count: This option is important to set if you want accurate ROI calculations to display on the dashboards. It calculates the ROI based on the transactions processed by the bot. As a best practice, enable your bots to log all business transactions.

This option calculates the ROI based on the transactions processed by the bot. Transaction count is the number of records processed by a bot and is different than Volume which is shown as a metric on the COE Dashboard. The Volume is the total number of records processed by all the bots in production.

The units are used in the widgets of the dashboard to display information about the sum of transactions or sum of hours saved. It also helps in identifying the number of transactions processed for a process, department, or both.



The screenshot shows the 'COE DASHBOARD' page in the 'Bot Insight' application. On the left, there's a sidebar with icons for 'Analyze' and 'Configure'. The main area has tabs for 'Dashboard' and 'Business Information'. The 'Business Information' tab is selected, displaying a table with the following data:

Business Dashboards	Folder Name	Bot Display Name	Process Name	Department	Money Saved Per Unit	Hours Saved Per Unit	Units
on	View Automation Anywhere/My Tasks/Sample Tasks	Reconciliations	Reconciliations	Banking	100	10	Transaction Count *
ing	View Automation Anywhere/My Tasks/Sample Tasks	Payables		Accounts	100	10	Per Hour *
ity	View Automation Anywhere/My Tasks/Sample Tasks	Receivables		Accounts	100	10	Per Hour *
	View Automation Anywhere/My Tasks/Sample Tasks	Expense Reports		Accounts	100	10	Transaction Count *
	View Automation Anywhere/My Tasks/Sample Tasks	Year End Reports		Finance	100	10	Transaction Count *
	View Automation Anywhere/My Tasks/Sample Tasks	Offer Letter Process		HR	100	10	Per Hour *

To configure a CoE dashboard, do the following:

## Procedure

1. Open the CoE dashboard that you want to configure. See [Viewing a CoE dashboard](#).
2. Click the Business Information tab.
3. Click Edit at the bottom-right of the window.
4. You can edit values for the following fields:
  - Bot Name
  - Process Name
  - Department Name
  - Money Saved Per Unit
  - Hours Saved Per Unit
  - Units
5. You can click Add Business Information to add additional business information. See [Adding business information to CoE dashboard](#).
6. Click Save and Generate Dashboard.

The following formulae are used to calculate the money saved and hours saved:

When the Per Hour option is selected from the Units list:

- Money saved = (End time – Start time) in hours \* the value specified in the Money Saved Per Unit field
- Hours saved = (End time – Start time) in hours \* the value specified in the Hours Saved Per Unit field

When the Transaction Count option is selected from the Units list:

- Money saved = SUM(for the selected numeric column) of all rows from Task\_Run table for that RUN ID \* the value specified in the Money Saved Per Unit field.

- Hours saved = SUM(for the selected numeric column) of all rows from Task\_Run table for that RUN ID \* the value specified in the Hours Saved Per Unit field.
- Failed transactions
- Aborted transactions

## Adding business information to CoE dashboard

Apart from the default business parameters, you can add business information to a CoE dashboard based on your requirements. You can add information, such as the name of the Bot Creator, process owner, department head, production date, and so on.

To add business information, do the following:

### Procedure

1. Open the CoE dashboard for which you want to add the business information. See [Viewing a CoE dashboard](#).
2. Click the Business Information tab.
3. Click Edit at the bottom-right of the window.
4. Click Add Business Information at the top-right of the window.
5. Provide a name for the field and its value in the respective fields.  
Note: For example, if you want to display the date on which the bot was deployed in the production environment, you can add a field 'Deployed Date' and its value as '12-Dec-2018'.
6. Click Save and Generate Dashboard.

## Viewing business analytics dashboard from CoE dashboard

You can view all business analytics dashboards that are published for a bot when configuring a CoE dashboard.

To view a business analytics dashboard, do the following:

### Procedure

1. Open a CoE dashboard. See [Viewing a CoE dashboard](#).
2. Click the Business Information tab.
3. Click View in the Business Dashboard column to view the business analytics dashboard for a bot.  
The list of published dashboards for the bot appears.
4. Click the name of the dashboard that you want to view.  
The dashboard for the selected bot appears in the Analyze tab.  
Note: The following message appears in the View section if there are no published dashboards associated with this bot:  
"No published business dashboard available for this Bot".

## Customizing CoE dashboard

You can add, delete, change visualization, apply filters, and do much more to customize a CoE dashboard.

However, you cannot customize a default CoE dashboard. To customize a default CoE dashboard, you must save a copy of the dashboard and then make changes to the saved dashboard. See [Editing dashboard widget](#).

11.3.3

## Managing CoE dashboards across environments

The Import and Export functions in the CoE dashboard enables you to manage business information and customized CoE dashboards across different environments.

According to your requirement, you can configure the business information, and then customize the CoE dashboards. First, configure the business information and the customized CoE dashboard in the source environment, and then configure them in the production or destination environment. Manual configuration across environments consumes time and impacts productivity.

When you perform the export or import function, all the dashboards including the Saved As and Published dashboards are moved from one environment to the other, except the CoE dashboard task run data. The destination environment retains the original task run data.

- [Exporting a CoE dashboard](#)

Export the Business Information and Customized CoE Dashboard from the staging environment to the production environment.

- [Importing a CoE dashboard](#)

Import the Business Information and Customized CoE Dashboard from the staging environment to the production environment.

11.3.3

## Exporting a CoE dashboard

Export the Business Information and Customized CoE Dashboard from the staging environment to the production environment.

To export a customized CoE dashboard, do the following:

### Procedure

1. Open the Bot Insight window. See [Viewing a dashboard](#).
2. Click the Configure tab.
3. Search for the CoE dashboard.  
The default CoE dashboard appears in the search results. The dashboard name appears in orange color text.
4. Select the CoE dashboard that you want to view from the search results.  
The selected CoE dashboard appears.

5. Click Export.  
The Export window appears.
6. Navigate to the export location.
7. Click OK.  
The .bipkg CoE dashboard export file appears in the export location.

## Importing a CoE dashboard

Import the Business Information and Customized CoE Dashboard from the staging environment to the production environment.

To import a customized CoE dashboard, do the following:

## Procedure

1. Open the Bot Insight window. See [Viewing a dashboard](#).
2. Click the Configure tab.
3. Search for the CoE dashboard.  
The default CoE dashboard appears in the search results. The dashboard name appears in orange color text.
4. Select the CoE dashboard that you want to view from the search results.  
The selected CoE dashboard appears.
5. Click Import.  
The Import window appears.
6. Navigate to the location.
7. Click OK.  
The .bipkg CoE dashboard file appears in the location you selected.

## Publishing CoE dashboard

When you publish a CoE dashboard, it collects the Bot run data and merges it with the business information. The merged data is referred to as the CoE data source.

After publishing, the Bot Insight engine runs every hour to collect the new Bot run data, merges it with the business information, and adds the merged data to the CoE data source. This ensures that you get the latest information on the ROI for your RPA program.

Note: You must have the `AAE Bot Insight Admin` role assigned to you to be able to publish a CoE dashboard.

To publish a CoE dashboard, do the following:

## Procedure

1. Open the CoE dashboard that you want to publish. See [Viewing a CoE dashboard](#).
2. You can configure or customize the CoE dashboard. See [Configuring a CoE dashboard](#) and [Customizing CoE dashboard](#).
3. Click Publish on the toolbar.
4. Specify a name with which you want to publish the dashboard in the Name field, and then click Okay.

The CoE dashboard is published and available to other users.

The Business Information tab appears in the read-only mode in the Analyze tab for the published CoE dashboard.

How does a new bot appear on a dashboard?

When a new bot is uploaded and run on the production environment, it automatically appears on the dashboard with default values setup in the Business Information tab. You can edit the information available in the Business Information tab to update the metadata for these bots. You do not need to republish an existing CoE dashboard as they automatically reference the business information that is configured.

## Bot lifecycle management

The Automation Anywhere Bot Lifecycle Management (BLM) utility 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 utility easily integrates with the DevOps workflow that supports separate development, testing, acceptance, and production environments, and is important to seamlessly move bots along with their dashboards from one environment to another.

The BLM utility also enables you to move bots within different environments and helps you to prevent any failure or disruption of data. You need to export and then import a bot to move it from one environment to another. The Automation Anywhere BLM utility enables you to bundle all the dependencies of a bot when transitioning it through the different environments.

**11.3.3** The BLM utility now supports both PostgreSQL and Oracle databases. Prior to Automation Anywhere Enterprise Version 11.3.3, BLM was supported only by SQL servers.

To move a bot from one environment to another:

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.

You must have `AAE_Admin` role to export and import the bots from the Enterprise Control Room. You can also export an import bots using APIs.

Note: You must use the same version for exporting and importing a bot. For example, if you export a bot with version 11.3.2, you must import that bot using the same version.

- [Exporting bot](#)

You can export a bot and its dependencies from one environment to another.

- [Importing bot](#)

You can import a bot and its dependencies from one environment to another.

## Exporting bot

You can export a bot and its dependencies from one environment to another.

### Prerequisites

To export a bot, the user role assigned to you must have the following permissions:

- Export bots
- Download permission for the folders that contain the bots and its dependencies
- Execute permission for the dependent MetaBots

If you have enabled version control in the Enterprise Control Room, ensure that the production version of the bots and their dependencies are set before you export them.

To export a bot, do the following:

### Procedure

1. Log in to the Enterprise Control Room.
2. Click My bots from the BOTS node on the left pane.  
The My bots screen appears.
3. Click Export bots on the toolbar.  
The Export bots + files screen appears.
4. In the Folders pane, click the folder that contains the bot that you want to export.  
The bots available in the selected folder are displayed in the Available items section.
5. Select the check box for the bots you want to export, and then click the right arrow icon.  
The selected bots appear within the Selected section.
6. Click Next.  
The screen for the PACKAGE SUMMARY tab appears.
7. Specify a name for the package in the Export package name field.
8. Specify a password for the package in the Password field.
9. Select the Exclude Metabot option if you do not want to include Metabot associated with the task in the package.
10. In the Items to export section, select the check box for the items that you do not want to include in the package.  
This section lists the bots and their dependencies that can be exported. You can differentiate between the bots and their dependencies based on the values in the DEPENDENCY TYPE column. The value for the selected bots appears as User selected in the column and the value for their dependencies is Supports <location of the bot>.

The bots and their dependencies for which you do not have appropriate permissions are displayed in the Items not allowed to export section.

Note: If version control is enabled, you can only select the bots and Metabots for which a production version is set. The latest version of the files is selected for the documents, workflows, and reports.

11. Click Export.  
The system exports the package to the default folder for downloads.

The package contains dashboards folder, JSON files, and the task.

## Importing bot

You can import a bot and its dependencies from one environment to another.

### Prerequisites

To import a bot, the user role assigned to you must have the following permissions:

- Import bots
- Upload permission for the folders that contain the bots and its dependencies

To import a bot, do the following:

### Procedure

1. Log in to the Enterprise Control Room.
2. Click My bots from the BOTS node on the left pane.  
The My bots screen appears.
3. Click Import bots on the toolbar.  
The Import bot files screen appears.
4. Click Browse, to select the package that you want to import from the machine.
5. Specify the password for the package in the Password field if a password is set for the package.
6. Specify the action to be taken when the files in the imported package already exist in the Enterprise Control Room.

The following options are available:

- Skip the file: Select this option if you want to skip the files that are available in the Enterprise Control Room and import the remaining files.
  - Overwrite the file with the imported one: Select this option if you want to overwrite the existing files in the Enterprise Control Room with the imported files.
  - Cancel the import: Select this option if you want to cancel the import operation if a file in the import package exists in the Enterprise Control Room.
7. Select an option to specify how to handle the production version of the bot if version control is enabled in the Enterprise Control Room.  
The following options are available:
    - Keep production version as is currently set: Select this option if you do not have to change the current production version of the bot.
    - Set production version to imported version of file: Select this option if you want to change the production version to the version of the imported bot.
  8. Click Import.  
The Bot Imported Successfully message appears.

All the imported dashboard should appear in the Bot Insight successfully.

## Bot Insight APIs

An application Programming Interface (API) allows other applications to connect with Automation Anywhere Enterprise and fetch the required data.

You need to provide the syntax of an API to call that API into a program where you want to use it. The syntax of an API contains various end points that are used to identify the methods to be used for an API.

## Prerequisites

- You must have the `AAE_Bot_Insight_Admin` or `AAE_Admin` role assigned to you.
- You must have the data API license

## Validations

If you want to get the data for a specific period, the following validations are applied:

- The dates must be provided in the ISO 8601 date format.
- The start date of the period must be less than the end date.
- The period must not be more than 60 days.
- The end date time must be less than the current date time.

### [Bot Insight API details](#)

To use the Bot Insight API, you need to send an HTTP request to the domain where the API is available.

## Bot Insight API details

To use the Bot Insight API, you need to send an HTTP request to the domain where the API is available.

The HTTP request is a Bot Insight API that is appended to the base URL of the domain. For example, `http://{DOMAIN Name}:{Port}/v1/botinsight/data/api/{method}`. In this syntax, you need to provide the domain name or its IP address, the mentioned URIs, and the Bot Insight method you want to call.

Note: The output of the Bot Insight APIs is paginated and fetches 1000 records at a time. You must use an offset to fetch the next set of records. Specify 0 as the offset to fetch data for the first 1000 records, 1 for the next 1000 records, and so on.

### `gettaskvariableprofile`

Description	This API gets information about the task variable profile.
Method	GET
Syntax	<code>http://{Host}:{Port}/v1/botinsight/data/api/gettaskvariableprofile/{JobName}?from= \${DateValue}&amp;to= \${DateValue}</code>
Input Parameters	JobName: Name of the job for which you want to get the data. DateValue: Specify a from and to date.
Returns	Returns information about the variable profile in JSON format.

Sample Output	<pre>{     "taskId": "462b2b03-2341-47e0-9c6e-d7098fd83761",     "taskName": "Firstbot",     "totalRecords": 2,     "profileVariables": [         {             "variableName": "v1",             "displayName": "V1",             "mappedToColumnName": "string1",             "attributeType": "NUMERIC",             "isAttributeTypeChanged": "N",             "totalRecords": 2,             "totalNullRecords": 0,             "sumOfValue": 4,             "minimumValue": "2",             "maximumValue": "2",             "averageOfValues": 2,             "totalDistincts": 1,             "newlyAdded": null,             "enabled": null         }     ],     "standardDashboardName": null }</pre>
User Role	You must have the AAE_Bot_Insight Admin role to access the API.

## gettasklogdata

Description	This API gets the analytics data logged for a task.
Method	GET
Syntax	<code>http://{Host}:{Port}/v1/botinsight/data/api/gettasklogdata/{task-name}/{page}/{from}/{to}</code>
Input Parameters	Task name: Name of the bot for which you want to get the data.

	<p>Page: Page number from which you want to fetch the data. For example, you must specify 3 if you want to fetch data from page 4 that contains data of records from 4000 to 5000.</p> <p>From: The start date of the period for which you want to fetch the data.</p> <p>To: The end date of the period for which you want to fetch the data.</p>
Returns	Returns the analytics data logged for the task in JSON format.
Sample Output	<pre>{     "totalRecords": 2,     "taskLogDataList": [         {             "machineName": "WIN-2T0MO2IOVEQ",             "runStatus": "CompletedSuccessfully",             "userId": 1,             "dateLogged": 1557124943026,             "variables": "{\"v1\":\"2\"}"         },         {             "machineName": "WIN-2T0MO2IOVEQ",             "runStatus": "CompletedSuccessfully",             "userId": 1,             "dateLogged": 1557125511668,             "variables": "{\"v1\":\"2\"}"         }     ] }</pre>
User Role	You must have the <code>AAE_Bot Insight Admin</code> role to access the API.

## getbotrundata

Description	This API gets information about the bot run data, such as on which server it ran, whether it ran successfully or encountered an error, and so on.
Method	GET
Syntax	<code>http://{Host}:{Port}/v1/botinsight/data/api/getbotrundata/{page}/{from}/{to}</code>

Input Parameters	<p>Page: Page number from which you want to fetch the data.</p> <p>From: The start date of the period for which you want to fetch the data.</p> <p>To: The end date of the period for which you want to fetch the data.</p>
Returns	Returns the information about the bot run data in JSON format.
Sample Output	<pre>{   "totalRecords": 1,   "botRunDataList": [     {       "id": 1,       "userName": "birunner",       "email": "aa@aa.com",       "clientType": null,       "hostName": "WIN-2T0MO2IOVEQ",       "iPAddress": "172.31.5.55",       "applicationPath": "C:\\Users\\Administrator\\Documents\\Automation Anywhere Files",       "username_1": null,       "fileName": "Firstbot.atmx",       "fileType": null,       "startTime": "2019-05-06 06:42:20.0",       "endTime": "2019-05-06 06:42:24.0",       "status": "COMPLETED",       "totalLines": "3",       "timeTaken": "4",       "successIndicator": "0"     }   ] }</pre>
User Role	You must have the AAE_Bot Insight Admin or AAE_Admin role to access the API.

## getaudittraildata

Description	This API gets the audit data for all the users.
Method	GET
Syntax	http://{Host}:{Port}/v1/botinsight/data/api/getaudittraildata/{page}/ {FromDateValue}/ {EndDateValue}
Input Parameters	<p>Page: Page number from which you want to fetch the data.</p> <p>From: The start date of the period for which you want to fetch the data.</p> <p>To: The end date of the period for which you want to fetch the data.</p>
Returns	Returns the information about the audit data of a user in JSON format.
Sample Output	<pre>{     "totalRecords": 58,     "auditTrailDataList": [         {             "activityType": "LOGIN",             "createdBy": "0",             "createdOn": "2019-05-06T13:21:11.000Z",             "detail": "",             "environmentName": "",             "eventDescription": "User log in successfully",             "hostName": "127.0.0.1",             "id": "hzhOjWoB9hDUfTUPLNYU",             "objectName": "N/A",             "requestId": "21b8e569-34b3-4ff4-96c4-3c4121376b1d",             "source": "Control Room",             "status": "Successful",             "userName": "superadmin"         },         {             "activityType": "LOGOUT",             "createdBy": "0",             "createdOn": "2019-05-06T12:36:33.000Z",             "detail": "",             "environmentName": ""         }     ] }</pre>

	<pre>     "eventDescription": "User log out successfully",     "hostName": "172.31.5.55",     "id": "hTgljWoB9hDUfTUPUNYY",     "objectName": "N/A",     "requestId": "1920f11b-78cc-48f3-a5f1-082dd8928374",     "source": "Control Room",     "status": "Successful",     "userName": "superadmin"   }, } </pre>
User Role	You must have the AAE_Admin role to access the API.

## Bot Insight FAQs

Common questions and answers about Bot Insight.

### Center of Excellence (COE) Dashboards

How often does a published CoE dashboard get updated?

A published CoE dashboard gets updated with new data every hour.

Can you add more fields to an existing CoE dashboard?

Yes, you can add any number of fields to a CoE dashboard using the default dashboard's Business Information section.

Can I change the Business Information after I have published the dashboard?

Yes, you can change the Business Information after publishing the dashboard. The updated information appears when the Bot Insight engine collects the data from the Enterprise Control Room for the bots that are run from that point on.

Let us consider a scenario in which you can see the Return on Investment (RoI) information changing over time. An Invoice Processing bot was used to save X amount of dollars till now, but after adding additional business information, it saves Y dollars. After you have updated this in the Business Information section, the Bot Insight engine collects the new data for the Invoice Processing bots that are run after this change.

Can I publish more than one CoE dashboard?

Yes, you can create and publish many copies of the default dashboard. This is useful for analysing the data through different visualizations across the dashboards.

Since the CoE dashboard contains valuable organizational information, how can I prevent this data from being seen by other unintended users?

By default, the CoE dashboard can only be accessed by the Bot Insight Admin user. For other users to be able to view the CoE dashboard, you need to assign the AAE\_Bot\_Insight\_Admin role to them. Only then will they be able to view, configure, and publish the CoE dashboards.

Can I view these dashboards in real-time on a mobile device?

Yes, in the AAE 11.3.2 version, you can view these dashboards on the Automation Anywhere RPA mobile app. This app is available on both iOS and Android through the App store and Google Play store respectively.

## Bot Insight dashboards

Why does the Enable Analytics for this task check box not appear for a task?

The Enable Analytics for this task check box appears only when the Bot Insight (for Business Analytics) license is purchased and registered from the Enterprise Control Room. If you do not see this check box in the Properties > Analytics section, contact your Automation Admin to ensure that the Bot Insight license (for Business Analytics) is purchased.

Why does no dashboard appear in the ANALYZE tab after I run a task from the Task Editor?

Verify that the Enable Analytics for this task check box in the Properties > Analytics section is selected and run the task again.

Why does the data in the Bot Insight dashboards not get refreshed after running a task from the Enterprise Control Room?

Bot Insight refreshes data in the dashboards that are deployed to Production every hour. This is the default configuration that can be changed after installation. You should wait for another hour and verify if the data is refreshed. Since many of the automation tasks that are deployed to Production from the Enterprise Control Room are scheduled and run automatically based on a schedule, the data gets automatically and regularly refreshed in a production deployment.

Why is the Save option not present on some dashboards?

Bot Insight automatically generates default dashboards for each task that is tagged for analytics with some variables. You cannot edit these default dashboards; therefore, they will not have a Save option on them. However, you can use the Save As option to create a user-created dashboard that can be customized and saved using the Save option.

Why does the 'Dashboard cannot be generated' message appear?

This message appears when you do not have at least one numeric variable tagged for analytics in your automation task. Without a numeric variable, analytics is not possible because KPIs and numbers represent the type of information that is plotted on the dashboards and analyzed over a timeline, across attributes (geographical, product category, customer group, and so on).

Why am I unable to see a recently published dashboard in the Analyze tab?

This could be because of the following:

- You do not have the required permissions on the underlying automation task, which is restricted using Role Based Access Control.
- The underlying automation task is not uploaded to the Enterprise Control Room.

Why does the 'Sorting' message appear in a dashboard widget and why does the graph not render in it?

This issue occurs occasionally. Refresh the current browser tab. The graph will now appear in the dashboard widget.

Why do the dashboard widgets get enlarged on export of the dashboard?

This is a known issue that occurs when exporting the dashboard as a PDF file or a PNG image file.

Refresh the current browser tab after the export. The dashboard widgets will now appear properly.

Why does no data appear for a dashboard that I searched for in the Analyze tab?

To resolve this issue, do the following:

1. Verify that the current default date filter setting (found at the bottom of the dashboard) is not set to show only the most recent tasks run.
2. Change it to show Current Quarter or Current Year.

---

You will now see the data appearing in the dashboard.

## Configuring ports for Zoomdata

Information about configuring the default and custom ports in Bot Insight for Zoomdata connectivity.

The Bot Insight default port configuration is:

- Port 8118- Elasticsearch
- Port 8291 - EDC (MSSQL/Oracle)

To configure any other ports, do the following:

### Procedure

1. Select the two free ports that you want to configure.  
Note: Ensure that the selected ports are in Listening mode.
2. Navigate to C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf, and open the edc-elasticsearch-6.0.properties file.
3. In the edc-elasticsearch-6.0.properties file, update the port number:server.port=<Given port # by user>
4. If you use a Microsoft SQL server, navigate to C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf, and open the edc-mssql.properties file.
5. In the edc-mssql.properties file, update the port number:server.port=<Given port # by user>
6. If you use an Oracle database, navigate to C:\Program Files\Automation Anywhere\Enterprise\zoomdata\conf, and open the edc-oracle.properties file.
7. In the edc-oracle.properties file, update the port number:server.port=<Given port # by user>
8. Restart Automation Anywhere Bot Insight Service Discovery . The following services are automatically restarted:
  - a) Automation Anywhere Bot Insight Service
  - b) Automation Anywhere Bot Insight Visualization
  - c) Automation Anywhere Bot Insight Scheduler
  - d) Automation Anywhere Bot Insight Elastic Search
  - e) Automation Anywhere Bot Insight Query Engine
  - f) Automation Anywhere Bot Insight EDC

## Troubleshooting

Information about troubleshooting various issues and errors related to Bot Insight dashboards.

The topics provide information about how to troubleshoot the following errors:

- Blank page appears in dashboard
- Connection errors in dashboard widgets
- TCP/IP error in dashboard widgets

- Dashboards appear in double
- Configure and Analyze tabs missing
- WebSocket error in dashboard
- Troubleshooting Bot Insight installation
  
- [Blank page appears in dashboard](#)  
When trying to access a dashboard, a blank page appears.
- [Connection error in dashboard widget](#)  
When trying to access a dashboard and its widgets, a connection error message appears.
- [TCP/IP error in dashboard widgets](#)  
When trying to access a dashboard and its widgets, a TCP/IP error message appears.
- [Dashboards appear in double](#)  
The operational analytics dashboards erroneously appear in double. This occurs when the dashboard ID in the botinsight.dwa.dashboard\_operations table does not get updated with the new ID in Zoomdata by the installer during an upgrade.
- [Configure and Analyze tabs missing](#)  
The Configure and Analyze tabs do not appear in the left pane of the Bot Insight dashboard. This issue occurs when the Bot Insight service is not running or is stopped.
- [WebSocket error in dashboard](#)  
When opening a dashboard, the following websocket error message appears: A websocket error has occurred. WebSocket connection was closed or cannot be opened. Trying to reconnect.
- [Troubleshooting Bot Insight installation](#)  
When installing the Enterprise Control Room, you may encounter an issue with accessing the dbutility.jar file.

## Blank page appears in dashboard

When trying to access a dashboard, a blank page appears.



This is because the Bot Insight services are disconnected. To resolve this issue, do the following.

## Procedure

1. Restart all the Bot Insight services in the following order:

- a) Automation Anywhere Bot Insight PostgreSQL
  - b) Automation Anywhere Bot Insight Service Discovery
  - c) Automation Anywhere Bot Insight Query Engine
  - d) Automation Anywhere Bot Insight EDC
  - e) Automation Anywhere Bot Insight Visualization
  - f) Automation Anywhere Bot Insight Scheduler
  - g) Automation Anywhere Bot Insight Service
2. Verify that Zoomdata is running by browsing to the Zoomdata URL. You can find the correct URL in the C:\Program Files\Automation Anywhere\Enterprise\DWAService\bin\src\main\resources \DWMP\_CONNECTIONS.properties file. Search for the visualization property name.
  3. Browse to the zoomdata.properties file that can be found in C:\Program Files\Automation Anywhere \Enterprise\zoomdata\conf\zoomdata.properties file. Search for http.port and server.port in the properties files to check that the correct Zoomdata service port is being used.
  4. Browse to C:\ProgramData\AutomationAnywhere\Logs and check the BI\_Service.log and zoomdata.log files for errors.
  5. Check that the errors are not due to Postgres. To resolve Postgres-related errors, see the PostgreSQL documentation.

## Connection error in dashboard widget

When trying to access a dashboard and its widgets, a connection error message appears.



This is because the Bot Insight Visualization service is unable to connect to the SQL server. To resolve the problem, do the following:

## Procedure

1. Open the C:\Program Files\Automation Anywhere\Enterprise\DWAService\bin\src\main\resources \DWMP\_CONNECTIONS.properties file.
2. Check the following details and make changes where required.
  - operations.db.serverName= <SQL server hostname>
  - operations.db.portNumber= <SQL server port>
  - operations.db.user= <SQL server username>
  - operations.db.password=<SQL server password>
  - operations.db.databaseName=<Control Room database name>

- operations.db.integratedSecurity=<Is Windows authentication being used>
3. Try to connect to the SQL server on the Enterprise Control Room database or Bot Insight database using the updated connection details.
  4. If all the connections work, restart the Bot Insight service. The dashboard widgets should now appear.

## TCP/IP error in dashboard widgets

When trying to access a dashboard and its widgets, a TCP/IP error message appears.



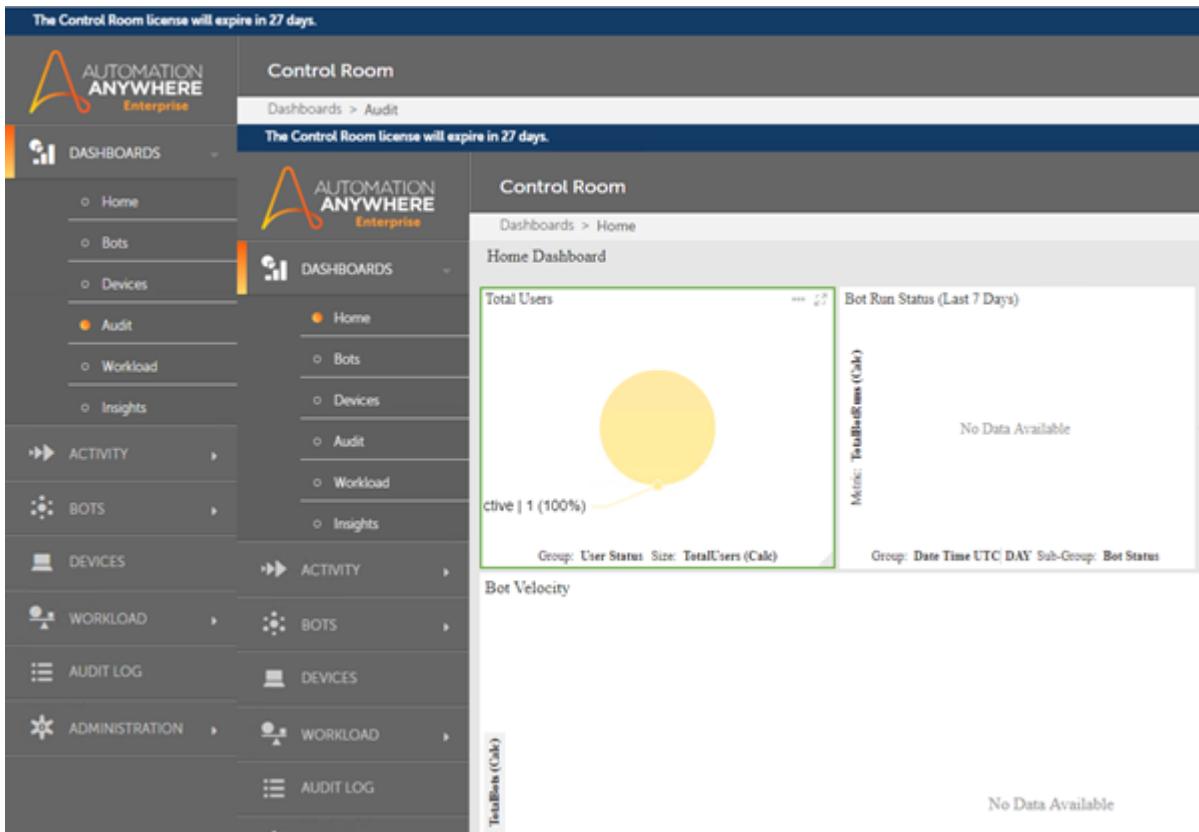
To resolve the problem, do the following:

## Procedure

1. Verify the connection information in the C:\Program Files\Automation Anywhere\Enterprise\DWAService\bin\src\main\resources\DWMP\_Connections.properties file.
2. Try to connect to the SQL server on the Enterprise Control Room database or Bot Insight database using the connection details in the DWMP\_Connections.properties file.
3. If all the connections work, restart the Bot Insight service. The dashboard widgets should now appear.

## Dashboards appear in double

The operational analytics dashboards erroneously appear in double. This occurs when the dashboard ID in the botinsight.dwa.dashboard\_operations table does not get updated with the new ID in Zoomdata by the installer during an upgrade.



To resolve the problem, do the following:

## Procedure

1. Log in to Zoomdata.
2. Open the dashboard for which you are seeing double images.
3. In the browser URL, copy the ID that is after the plus sign. This is the dashboard ID.
4. In the botinsight.dwa.dashboard\_operations table, update the zoomdatadashboardid column for the dashboard with this ID.
5. If the problem persists, run the bimigration.bat file (located in the root Enterprise Control Room installation folder). This will resolve the issue.

## Configure and Analyze tabs missing

The Configure and Analyze tabs do not appear in the left pane of the Bot Insight dashboard. This issue occurs when the Bot Insight service is not running or is stopped.

To check if the Bot Insight service is started successfully and running, find a log message in the BIService.log file, which is like the following:

DWMPAPP:99 - Bot Insight 11.3 service is now running on port 8091

Note: The Bot Insight version number and port number may be different.

---

If you did not find this in the log file, try to restart the Bot Insight service. This will resolve the issue.

## Websocket error in dashboard

When opening a dashboard, the following websocket error message appears: A websocket error has occurred. Websocket connection was closed or cannot be opened. Trying to reconnect.

This error occurs because the Bot Insight Visualization service is unable to update the dashboards. Try the following solutions to resolve this problem.

### Solution 1

1. Check that all the Bot Insight services are running.
2. Check that your firewall settings are configured to accept incoming websocket data.
3. Try to use a different web browser.
4. Restart the Bot Insight Visualization and Bot Insight Scheduler services.

### Solution 2

If this error occurs only in Internet Explorer, add ws:\\localhost\\ to the Internet Explorer configuration using Tools > Internet Options > Security > Local Intranet > Sites > Advanced.

## Troubleshooting Bot Insight installation

When installing the Enterprise Control Room, you may encounter an issue with accessing the dbutility.jar file.

To resolve this issue, do the following:

### Procedure

1. Uninstall the Enterprise Control Room.
2. Delete the Automation Anywhere folder in the C:\\Program Files directory.
3. Delete the Automation Anywhere folder in the C:\\Program Data directory.
4. Delete the data in the Bot Insight and Enterprise Control Room databases.
5. Delete the files in the C:\\Temp folder directory.
6. Reinstall the Enterprise Control Room.

The issue will not occur when reinstalling the Enterprise Control Room.

# Mobile app overview

This is the landing page for the collection of topics related to the Automation Anywhere Mobile app.

The Automation Anywhere Mobile app offers clients the ability to monitor and manage their digital workforce through their mobile devices. The app provides real-time data on the client's return on investment, bot status (completions and failures), and the ability to start, pause, and stop bots.

- [Mobile app capabilities](#)

The Automation Anywhere Mobile RPA app capabilities include Cost Savings Dashboard, bot Activity Dashboard, bot Start / Stop, and Best Workers.

- [Connecting to a Enterprise Control Room](#)

Connect to a Enterprise Control Room from the Automation Anywhere Mobile app.

- [Mobile app FAQ](#)

Common questions and answers about the Automation Anywhere Mobile app.

Related tasks

[Connecting to a Enterprise Control Room](#)

Related reference

[Mobile app capabilities](#)

[Mobile app FAQ](#)

## Mobile app capabilities

The Automation Anywhere Mobile RPA app capabilities include Cost Savings Dashboard, bot Activity Dashboard, bot Start / Stop, and Best Workers.

Use the Automation Anywhere Mobile app to monitor and manage bots. The app offers the following capabilities:

Cost Savings Dashboard

Provides data visualizations to demonstrate the client's return on investment.

Note: The demo uses example data for a Center of Excellence Dashboard. Mobile app users who are connected to the Enterprise Control Room will see their custom dashboards.

Data is presented in the following panels:

1. Calculations of total Bot Run Time, total Hours Saved, and total Money Saved
2. Pie chart of Hours Saved By Process (by department or process)
3. Bar chart of Hours Saved (by month)
4. Bar chart of Money Saved (by month)

bot Activity Dashboard

Reports the status of each bot with details of start date and time, run time, and device name.

The Completed bots panel also reports the total number of runs.

bot Start / Stop

Enables users to start, pause, or stop individual bots.

Best Workers

Enables users to select key bots for monitoring by clicking the star to the left of a bot.

The information icon to the right of a bot opens a panel with the following information:

- Average Runtime (seconds)
- Minimum Runtime (seconds)
- Maximum Runtime (seconds)
- Total number of Runs
- First Run Date and Time
- Most Recent Run and Time
- Next Run Date and Time

Related concepts

[Mobile app overview](#)

Related tasks

[Connecting to a Enterprise Control Room](#)

Related reference

[Center of excellence dashboards](#)

## Connecting to a Enterprise Control Room

Connect to a Enterprise Control Room from the Automation Anywhere Mobile app.

The Automation Anywhere Enterprise Control Room URL may not be published externally (publicly). Mobile app users must either connect to same Wi-Fi as their organization, or use a VPN to ensure IP reachability.

### Procedure

1. Open the Command Prompt.
2. Type  
`ipconfig`  
and press Enter.
3. Note the IPv4 Address.
4. Open the Automation Anywhere Mobile app.
5. Select Add Control Room.
6. Type the IPv4 Address and name the Enterprise Control Room instance.
7. Login with your Enterprise Control Room credentials.

Related concepts

[Mobile app overview](#)

Related reference

[Mobile app capabilities](#)

## Mobile app FAQ

Common questions and answers about the Automation Anywhere Mobile app.

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 30MB.

What version of Automation Anywhere Enterprise Control Room is required?

Automation Anywhere Enterprise Control Room version 11.3.1. or greater is required.

How do I enable the Return on Investment mobile dashboard?

Enable Bot Insight and customize the Center of Excellence dashboard.

Is the communication between the Automation Anywhere Enterprise Control Room and the Mobile app secure?

Yes, the communication between Automation Anywhere Enterprise Control Room and the Mobile app is TLS encrypted. It is the same encryption that is used with HTTPS websites.

Related reference

[Center of excellence dashboards](#)

# Developer documentation

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Browse the latest developer documentation including API reference, articles, and sample code.

- [Get started creating, modifying, and understanding bots](#)  
The tasks in Build a basic bot cover general concepts related to creating and editing a TaskBot.
- [Build advanced bots with the Enterprise client](#)  
Design different types of bots to do different functions and tasks. MetaBots provide dynamic input and output to other bots.
- [Advanced MetaBot summary and best practices](#)  
In this task 2 DLLs were integrated into a MetaBot and Logic was developed to perform operations with an external library and REST API.
- [Recommended standards for bot design, creation, and submission](#)  
This content provides guidance for bot developers throughout the entire process of bot development from designing and creating bots through posting them to the Bot Store.
- [Why Build on Automation Anywhere?](#)  
Automation Anywhere is the industry leader in Robotic Process Automation (RPA) as recognized by multiple analyst firms. We see a future where digital workers engage side-by-side with every employee in every business, making them more productive.
- [Automation Anywhere Digital Worker overview](#)  
A Digital Worker contains a set of professional skills that enable it to act, process, and analyze in the same ways as a human.

## Get started creating, modifying, and understanding bots

The tasks in Build a basic bot cover general concepts related to creating and editing a TaskBot.

Bot developers or Bot Creators must have a basic understanding of the following concepts:

- Variable: A storage location that is referenced and manipulated by a computer program. Variables can be for known or unknown information.
- Loops: Runs one or more lines of code repetitively. A loop typically repeats, depending on a condition, or runs once for each element in a collection.
- [Build a basic bot using the Enterprise client](#)  
Build basic bots to automate repetitive tasks and thereby improve speed, accuracy, and human resource effectiveness.
- [Edit a basic bot using the Enterprise client](#)  
Modify a TaskBot to improve and generalize its functions and behaviors.
- [Build a basic MetaBot to automate input to a web page using the Enterprise client](#)  
MetaBots encapsulate assets and logic to do common processes and tasks. Different MetaBots can be used by different TaskBots, thereby providing a reusable library of functions.
- [Recommended standards for bot design, creation, and submission](#)  
This content provides guidance for bot developers throughout the entire process of bot development from designing and creating bots through posting them to the Bot Store.

- [Get certified as a bot developer](#)

Automation Anywhere University provides two options to get certified as an Automation Anywhere bot developer.

Related concepts

[Bots - Overview](#)

[Bot design guidelines and standards](#)

Related reference

[Bot Creator overview](#)

[Using the Workbench](#)

[Customizing the Enterprise client](#)

## Build a basic bot using the Enterprise client

Build basic bots to automate repetitive tasks and thereby improve speed, accuracy, and human resource effectiveness.

This tutorial covers the steps to create a basic bot that can extract data from a file and create users on a website by typing the data on a web page. This tutorial also explores some of the basic concepts and best practices for designing and building bots.

For more detailed training, see [Learning Trail Details](#).

- [Build a basic bot](#)

This task demonstrates how to use the Web Recorder to capture the steps of completing a web form.

- [What was learned from building a basic bot](#)

The "Build a basic Bot" tutorial covers the fundamentals of Automation Anywhere and how to create a bot.

Related concepts

[Bots - Overview](#)

[Bot design guidelines and standards](#)

Related reference

[Bot Creator overview](#)

[Using the Workbench](#)

[Customizing the Enterprise client](#)

## Build a basic bot

This task demonstrates how to use the Web Recorder to capture the steps of completing a web form.

## Prerequisites

Verify that the Automation AnywhereEnterprise client is installed and set up.

- Verify connectivity between the Enterprise client and the Enterprise Control Room.

- Verify access to the following website: <http://rpademo.automationanywhere.com>

Note: The website used in this tutorial is only a demonstration website. No user data is saved. It is not an active [Automation Anywhere](#) website.

- Create fictitious user information for these fields:

- First Name

- Last Name
- Company Name
- Email Address
- Phone Number
- Username
- Password

About this task:

The primary focus of this task is creating a basic TaskBot that takes user-provided data and enters that data into a web form.

## Procedure

1. Open the Automation Anywhere Enterprise client.
2. Click New.
3. Click Web Recorder.

This tutorial uses the Web Recorder. For more general information about recorders, see [Create an automated task](#)

4. In the URL field of the Web Recorder, type `http://rpademo.automationanywhere.com`.
5. Click Start.  
A Web Recorder Tip appears. Check Don't show this message again to prevent this message from appearing again or leave it blank to continue seeing this tip in the future.  
The following two windows are open:
  - A web browser with a login screen.
  - The Web Recorder control window.
6. Click OK to continue.  
When the Web Recorder starts, all user actions, for example, mouse clicks and keystrokes, are captured and stored in a TaskBot.
7. Click For new users, [click here](#) to register ? in the web browser.
8. Complete the form with fictitious user information.  
Important: Do not click Register.
9. In the Web Recorder control window, click Stop Recording.
10. In the Filename field of the Save Task dialog, type MyFirstTaskBot.
11. Click Save.  
The task appears in the My Tasks list in the Enterprise client.

## Next steps

Verify your work.

- Close the browser used in this tutorial.
- Select MyFirstTaskBot, and click Run.

A web browser with all the provided information completed appears.

Next steps

In the next task [Modify a basic bot to process dynamic data](#), open MyFirstTaskBot.atmx. The task opens in the Workbench. All the recorded task steps are listed under Actions List.

---

#### Related concepts

[Connect to Automation Anywhere Enterprise Control Room](#)

[Bot design guidelines and standards](#)

#### Related tasks

[Connect from Client](#)

[Record a task](#)

#### Related reference

[Best practices for recording tasks](#)

[Using the Web Recorder](#)

[Bot Creator overview](#)

## What was learned from building a basic bot

The "Build a basic Bot" tutorial covers the fundamentals of Automation Anywhere and how to create a bot.

The following are takeways from creating a basic TaskBot.

## Recorders

The Web Recorder used in this tutorial records web pages and captures all the clicks and text entries. Including the Web Recorder, there are four methods for recording tasks:

### Web Recorder

Records web-only tasks. If website controls on a page change location, the task adjusts to run without error. If the properties of the web controls change, the automation task can be updated to ensure that the task runs successfully.

Tip: Web Recorder only works with Internet Explorer. Automate web applications with other browsers such as Google Chrome or Microsoft Edge using Workbench.

### Screen Recorder

Record tasks that run on the same machine where the task is created by recording mouse clicks and keyboard operations. Screen recorder may be referred to as standard recorder in some legacy topics. Important: The Screen Recorder is the most basic recorder. Recorded tasks depend on the UI location and screen resolution. If conditions change related to the target application, recorded tasks may not work.

### Smart Recorder

Captures common UI objects used in both Windows-based and web-based applications. The objects include common UI controls such as buttons, text fields, and combo boxes. Some of the related technologies include HTML, .Net, WPF, Java, Flex, and Silverlight. The UI objects are saved as a set of Object Cloning commands.

Tip: The Smart Recorder captures automated web application, but it is strongly recommended to use the Web Recorder to capture web-based content.

### Workbench

Create tasks manually. Assign relevant actions to the task using the commands provided in the editor.

## Understand the Workbench

When a recorder finishes, it saves the recorded steps as commands in a task file. Specific recorders output only the following commands:

- Web Recorder: Web Recorder commands
- Smart Recorder: Object Cloning commands

- Screen Recorder: Insert Keystrokes, Insert Mouse Moves/Clicks/Scroll commands

To edit an existing task, double-click its name or right-click the name and select Edit. The Workbench screen shows a list of each line created by the recorder. Each line represents one recorded step. Edit a single step to enhance its function. Edit tasks in the Workbench editor to modify the recorded commands to make a fully-featured TaskBot.

Use the Workbench editor to modify and update a TaskBot. The Workbench provides the tools to do things, for example:

- Drag and drop commands from the Command tab to the Actions List.
- Move steps inside flow control statements, for example, moving steps into a loop.
- Add and manage variables.

Read [Using the Workbench](#) for details.

## Understand the basic TaskBot

You must understand the TaskBot created in this exercise. It contains static data that was captured using the Web Recorder.

1. The first two Actions List items are for the more generic task of adding users to this website.
2. Actions List items 3 through 9 are steps that type static user information. This task can repeat exactly what the Web Recorder captured. There is no dynamic input of multiple users.

In the next tutorial, [Edit a basic bot using the Enterprise client](#), what was recorded in this exercise is modified to dynamically read data from a CSV file and input that data to a web page.

Related concepts

[Bot design guidelines and standards](#)

Related reference

[Using the Workbench](#)

## Edit a basic bot using the Enterprise client

Modify a TaskBot to improve and generalize its functions and behaviors.

The basic TaskBot created in this tutorial accepted only static data. A TaskBot is much more useful if it accepts and processes external data. The second part of this tutorial focuses on modifying the basic TaskBot to accept and process data from a CSV file and output that data to a web page.

- [Modify a basic bot to process dynamic data](#)

This task shows bot developers how to modify a TaskBot so that the TaskBot can dynamically process data from a CSV file and use that data to complete a web page.

Related tasks

[Record a task](#)

Related reference

[Using the Workbench](#)

[Manage bot dependencies](#)

[Using the Variable Manager](#)

## Modify a basic bot to process dynamic data

This task shows bot developers how to modify a TaskBot so that the TaskBot can dynamically process data from a CSV file and use that data to complete a web page.

### Prerequisites

Reading data from a CSV file is one example of reading data from a file. Bots built using Automation Anywhere can read data from a Microsoft Excel worksheet, an SQL database, a PDF file, a web page and many other sources.

Before you begin:

Create and save a CSV file that contains the information. Save the file as `names.csv`.

```
Robin,April,Dreamer LLC,arobin.kent@dreamer.com,212-555-1212,arobin,changeMeNow  
Robert,Friend,Dreamer LLC,bfriend@dreamer.com,212-555-1213,bfriend,just4now  
Frank,Olds,Dreamer LLC,folds@dreamer.com,212-555-1214,folds,just4you
```

This tutorial uses the file `names.csv`.

About this task:

This task is the next phase in understanding basic bot design and modification. Regardless of which recorder was used, a recorded task is not a complete process. Recorders are a great first step, but bot developers must add business logic and edit recorded commands to ensure proper playback by the Bot Runner.

Complete these high-level tasks to make this TaskBot read data from a file and save the data in a web form. In this task, bot developers do the following:

- Create a loop for processing each row in a CSV file.
- Make each step accept input from a CSV file and write output to the web form.

To make the basic TaskBot accept data from a CSV file, do the following:

### Procedure

1. Open the Automation Anywhere Enterprise client.
2. Open the task created in the [Build a basic bot](#) task, `MyFirstTaskBot.atmx`.  
Tip: Double-click the task to open it in Workbench, or right-click and select Edit.  
The TaskBot opens in the Workbench. Each line in the Actions List represents one step that was captured by the Web Recorder.
3. Click item 2 in the Actions List.  
This is the location where the command Read From CSV/Text is added. Add the command immediately above the first set text step, "Set text `'\$Fielddata.Column(1)` . . .".
4. In the Commands tab on the left, drag and drop the Read From CSV/Text command immediately below item 2 in the Actions List.  
The Read From CSV/Test dialog opens.
5. In the Read From CSV/Test window, click the ellipses button at the end of the Select File field.
6. Locate and select the file `names.csv` that you created in the prerequisite task.

7. Click Open.
  8. Click Save.
- The Start Loop and End Loop commands are now included in the Action List. The green line is a comment added by Automation Anywhere. The comment in the Action List indicates which system variable gets the information from the file.
9. Select all of the "Set text `\\$Filedata . . ." items in the Actions List.
  10. Drag and drop the End Loop step to the bottom of the Actions List.
  11. Modify each of the "Set text `\\$Filedata . . ." steps.
    - a) Double-click the "Set text `\\$Filedata . . ." line immediately after the Start Loop.
    - b) In the Web Recorder window, click Advanced View.
    - c) Clear the Text to set field.
    - d) Press the F2 key to open the Insert Variable dialog.
    - e) Select the Filedata Column.
    - f) Click Insert.
    - g) Clear the Column Number / Select Variable field and type 1.
    - h) Click OK.
    - i) Click Save.
- Repeat these steps for each "Set text `\\$Filedata . . ." line.
- Attention: Each line in the file `names.csv` is equivalent to a step or row. Each step has seven columns, for example:
- j) Column 1 = John
  - k) Column 2 = Doe
  - l) Column 3 = My company
  - m) Column 4 = john.doe@mycompany.com
  - n) Column 5 = 212-555-1212
  - o) Column 6 = jdoe
  - p) Column 7 = Developer
- q) Repeat these steps for each of the "Set text `\\$Filedata . . ." lines to input the appropriate column number. Each comma-separated value is a column in a step.
12. At the top of the Workbench window, click Save.
  13. Click Run to test the bot.

## Next steps

In the next task of this series, [Build a basic MetaBot to automate input to a web page using the Enterprise client](#), learn how to create and use a MetaBot to add data to a web form.

Related reference

[Editing TaskBots](#)

[Using the Workbench](#)

[Manage bot dependencies](#)

[Using the Variable Manager](#)

## Build a basic MetaBot to automate input to a web page using the Enterprise client

MetaBots encapsulate assets and logic to do common processes and tasks. Different MetaBots can be used by different TaskBots, thereby providing a reusable library of functions.

This task adds to the TaskBot created and modified in the [Build a basic bot using the Enterprise client](#) and [Edit a basic bot using the Enterprise client](#).

Important: Verify that MyFirstTaskBot.atmx is complete and fully functional.  
Complete each of the subtasks in the order they are listed:

**Step 1: Create a basic MetaBot**

Build a MetaBot in this task. This MetaBot takes parameters (data) from a TaskBot and adds the data to a web form.

**Step 2: Add an asset to a MetaBot**

Add screens, DLLs, and folders as assets to MetaBots.

**Step 3: Create Logic for a MetaBot**

You must add Logic to MetaBots to manage the assets and make the functionality available for use by other bots.

**Step 4: Import data to a MetaBot**

Import data from variables to fill in the fields of a web page.

**Step 5: Replace task steps with a MetaBot**

Use MetaBots to encapsulate assets and logic to do common processes and tasks. MetaBots are reusable by other bots, allowing Bot developers to create a library of MetaBots for reuse.

**Step 6: Verify a basic MetaBot**

Run a bot from the Workbench to verify everything works as expected.

Related concepts

[Bots - Overview](#)

[Bot design guidelines and standards](#)

Related reference

[Bot Creator overview](#)

[Using the Workbench](#)

[Customizing the Enterprise client](#)

## Create a basic MetaBot

Build a MetaBot in this task. This MetaBot takes parameters (data) from a TaskBot and adds the data to a web form.

## Prerequisites

- Verify connectivity between the Enterprise client and the Enterprise Control Room.
- Verify access to the following website: <http://rpademo.automationanywhere.com>  
Note: The website used in this tutorial is only a demonstration website. No user data is saved. It is not an active [Automation Anywhere](#) website.
- Create fictitious user information for these fields:
  - First Name
  - Last Name
  - Company Name
  - Email Address
  - Phone Number
  - Username
  - Password

Verify that Microsoft Internet Explorer is open to the page to capture, <http://rpademo.automationanywhere.com/newuser.php>.

Important: Verify that MyFirstTaskBot.atmx is complete and fully functional.

## Procedure

1. Open the Automation Anywhere Enterprise client.
2. Click the MetaBot tab.
3. Click New.
4. Select the Application Specific radio button.
5. Select Internet Explorer in the Application(s) list.  
Note: If Internet Explorer(IE) is not in the application list, open IE, then click Refresh.
6. Type `AddNewUsers` in the MetaBot Name field.
7. Click Create.
8. Type `Add New Users` in the Logic Name field.

## Next steps

Follow the steps in the [Add an asset to a MetaBot](#) to add a screen to this MetaBot.

### Add an asset to a MetaBot

Add screens, DLLs, and folders as assets to MetaBots.

## Prerequisites

Complete the [Create a basic MetaBot](#) task.

Note: Standard > Screen Capture option is not supported with Google Chrome browser. Use the Object Cloning command instead or use a Microsoft Internet Explorer browser.

## Procedure

1. In the MetaBot Designer, click Add Screen.  
Tip: If Add Screen is not visible, expand the MetaBot Designer window.  
The Open Screens window opens.
2. Select Standard or Object Cloning for the capture type.
3. Click the screen to add.  
A thumbnail of the screen is visible when it is added as an asset.

## Next steps

All MetaBots need logic to enable its assets to work. [Create Logic for a MetaBot](#) is the next step in the parent task [Create a basic MetaBot](#).

### Create Logic for a MetaBot

You must add Logic to MetaBots to manage the assets and make the functionality available for use by other bots.

## Prerequisites

The [Add an asset to a MetaBot](#) task must be completed successfully before you can complete this task.

This is the second subtask for the [Create a basic MetaBot](#) parent task.

## Procedure

1. Select the asset created in [Add an asset to a MetaBot](#).
2. Click LOGIC.
3. Click Add Logic.
4. Click VARIABLE MANAGER.
  - a) Click Add.
  - b) Type the `vFirstName` in the Name field.
  - c) From the Parameter Type drop-down list, select Input.
  - d) Click Save.
  - e) Click Yes to leave the information window.

Note: When a null variable is added, an information window appears. The variable value can be assigned later.

The new variable is added to the list of Local Variables.
5. Repeat the previous steps to add each of the following variables:
  - `vLastName`
  - `vCompanyName`
  - `vEmail`
  - `vPhone`
  - `vUserName`
  - `vPassword`
6. Click Save.
7. In the Logic Name field, type `Add New Users`.
8. Click Save.

## Next steps

You must add the ability for the MetaBot to import and use the data from the CSV file. The next task is [Import data to a MetaBot](#).

### Import data to a MetaBot

Import data from variables to fill in the fields of a web page.

## Prerequisites

The [Create Logic for a MetaBot](#) task must be completed successfully before you can complete this task.

## Procedure

1. Drag and drop Import Dataset from the Commands tab to the Actions List.
  2. In the Import Dataset dialog, add the corresponding variable to each object value.
    - a) Click in the Value field for the `firstname` object.
    - b) Press the F2 key.
    - c) Select `vFirstName`.
    - d) Click Insert.
    - e) Repeat for each of the lines in the Import Dataset dialog.
- Note: The object names might not be in the same order as listed in the following table.

#	Entry name	Type	Value
1	firstname	Text box	vFirstName
2	phonenumer	Text box	vPhone
3	lastname	Text box	vLastName
4	password	Text box	vPassword
5	companynam	Text box	vCompanyName
6	username	Text box	vUserName
7	email	Text box	vEmail

3. After adding all the variables, click Save in the Workbench menu ribbon.
4. Click Save.
5. Click Save.

## Next steps

The MetaBot created in this task can be used by other bots, go to [Replace task steps with a MetaBot](#) to see how to add this MetaBot the TaskBot created in [Build a basic bot using the Enterprise client](#).

### Replace task steps with a MetaBot

Use MetaBots to encapsulate assets and logic to do common processes and tasks. MetaBots are reusable by other bots, allowing Bot developers to create a library of MetaBots for reuse.

### Prerequisites

- The [Import data to a MetaBot](#) task must be completed successfully before you can complete this task.
- Important: Verify that MyFirstTaskBot.atmx is complete and fully functional.

### Procedure

1. Navigate to the main screen of the Automation Anywhere Enterprise client where the TaskBot was created in [Build a basic bot using the Enterprise client](#).
2. Open the TaskBot MyFirstTaskBot.atmx.
3. Disable or delete all the "Set text ` Filedata Column. . ." rows.
4. Click the MetaBot tab.
5. Drag and drop the MetaBot AddNewUsers.mbot between Start Loop and Stop Loop.

A window titled MetaBot opens with a list of the Input Parameters created in the Logic for this MetaBot.

- a) Click the Value field next to the vFirstName Input Parameter.
- b) Press F2.
- c) In the list of variables, select the Fileddata Column.
- d) Click Insert.
- e) Clear the Column Number / Select Variable field and type the appropriate column number for each parameter.
  - f) Column 1 = vFirstName

- g) Column 2 = vLastName
  - h) Column 3 = vCompanyName
  - i) Column 4 = vEmail
  - j) Column 5 = vPhone
  - k) Column 6 = vUserName
  - l) Column 7 = vPassword
6. Click Save.
7. In the Workbench menu ribbon, click Save.

## Next steps

To verify that the TaskBot works correctly, go to [Verify a basic MetaBot](#).

Related concepts

[Bot design guidelines and standards](#)

Related reference

[Using MetaBot Logic in TaskBots and MetaBot Logics](#)

[Using the Workbench](#)

## Verify a basic MetaBot

Run a bot from the Workbench to verify everything works as expected.

## Prerequisites

The [Replace task steps with a MetaBot](#) task must be completed successfully before you can complete this task.

## Procedure

1. Open the Automation Anywhere Enterprise client.
2. Select the TaskBot MyFirstTaskBot.atmx.
3. In the Workbench menu ribbon, click Run.

Related concepts

[Bot design guidelines and standards](#)

Related reference

[Work with MetaBot Designer using the Enterprise client](#)

[Using MetaBot Logic in TaskBots and MetaBot Logics](#)

[Using the Workbench](#)

## Recommended standards for bot design, creation, and submission

This content provides guidance for bot developers throughout the entire process of bot development from designing and creating bots through posting them to the Bot Store.

Read the following sections to gain a better understanding of each of the topics.

- [Start with Sample bot from Bot Store](#)

In order to assist bot and Digital Worker developers in creating high quality software, the bot package

submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

- [Enable bots to run on other computers](#)

Bot developers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

- [Modular Bots are a must](#)

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

- [Use variables liberally](#)

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

- [Variable names](#)

Automation Anywhere has a recommended variable naming convention.

- [Passing parameters from TaskBots to MetaBots](#)

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

- [Use Credential Vault to store user IDs, passwords, and other sensitive data](#)

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

- [Follow secure coding practices](#)

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

- [Error handling](#)

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

- [Bot configuration](#)

It is important to make the configuration of the bot straightforward for end users who are installing it.

- [Code comments](#)

Remember to liberally comment bot code.

- [Create a Readme file](#)

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

- [Other considerations for bot design and development](#)

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

- [Checklist for Bot Store submissions](#)

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

## Related concepts

[Build a basic bot using the Enterprise client](#)

[Build advanced bots with the Enterprise client](#)

[Why Build on Automation Anywhere?](#)

[Recommended standards for bot design, creation, and submission](#)

## Start with Sample bot from Bot Store

In order to assist bot and Digital Worker developers in creating high quality software, the bot package submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

Use the checklist for Bot Store submissions [Checklist for Bot Store submissions](#) and follow the Bot Store submission requirements. All requirements in this checklist must be met for a bot or a Digital Digital Worker Bot Store package submissions.

The checklist also provides the Readme Template example, as well as, Best Practice examples for a individual bot or a Digital Worker.

## Enable bots to run on other computers

Bot developers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

During the development of new bots, developers often point to local copies of files and attachments. This works great if the bot is only run on the developers' local computers. A local path looks something like this:

```
C:\Users\UserName\Documents...
```

Bot Runners are unattended computers (physical or virtual computers) whose job is to run the tasks presented to them. Because these Bot Runners have their own account login credentials, localized paths do not work.

The system variable \$AAApplicationPath\$ resolves this problem.

Local path during development:

```
C:\Users\UserName\Documents\Automation Anywhere Files\Automation Anywhere\My Docs\accounts.xlsx
```

Relative path that works in Bot Runner:

```
$AAApplicationPath$\Automation Anywhere\My Docs\accounts.xlsx
```

Not only does this make the path shorter, but it also makes the bot portable. When preparing a TaskBot to work with Bot Runner or a co-worker's computer, use the \$AAApplicationPath\$ anywhere that points to a local file.

Tip: Create variables, for example, "vPath," then use the Variable Operation with \$AAApplicationPath\$ to make the paths short and manageable.

## Modular Bots are a must

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

As with any object-oriented approach to programming, creating separate bots for each distinct function makes the code easier to understand, update, and reuse. Customers can more easily pick and choose the best components to include in their business process automation.

For example, these are typical steps to automate in a process:

1. Log in.
2. Create Lead.
3. Log out.

Each of these steps should be divided into unique TaskBots (.atmx files). Create a Master Bot to use for each of the three tasks in the correct order.

Consider creating and using MetaBots for common processes and tasks. MetaBots encapsulate assets and logic used in common processes and tasks, making those processes and tasks reusable by other bots. Over time a library of functions and tasks can be contained in MetaBots which are reusable by TaskBots. This avoids the need to create redundant functionality in multiple bots.

MetaBots are used to encapsulate logic inside a DLL, allowing bot developers to hide complex tasks and processes from users. Following are the high-level steps for adding a DLL to a MetaBot:

1. Create a DLL that does the respective function.
2. Add the DLL as an asset in the MetaBot Designer.
3. Add Logic to do the operation.
4. Use the MetaBot in other bots to do the task.

Related concepts

[Build a simple MetaBot with one DLL](#)

[Advanced MetaBot with two DLLs](#)

## Use variables liberally

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

Create new variables for an automation from the Variable Manager. The Variable Manager shows the local variables that are defined for each specific task. To create a new user variable, follow these steps:

## Procedure

1. Go to Workbench > Variable Manager.
2. In the Variable Manager, click Add at the bottom or right-click an existing variable and select Add.

In the Add Variable window, the Create New Variable option is selected by default.

3. Select a Variable Type.  
Enter a name and select the method for determining the value of the variable.

## Next steps

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.

- 
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Variable names

Automation Anywhere has a recommended variable naming convention.

- Variables start with "v", such as vPath.
- Lists start with "lst", such as lstMyList.
- Arrays start with "arr", such as arrPirateBooty.
- Randoms start with "rdm", such as rdmChoice.

Some developers prefer to add variable "type" prefixes to the front of their variables, for example:

- "int" for variables expected to hold whole numbers (integers)
- "str" for variables expected to hold a string of characters

Regardless of the naming scheme, variables in Automation Anywhere do not have a strong type.

This means, a variable that contains a number, then does a mathematical calculation, can later contain a string value. This is called loose typing. Although it adds flexibility when working with variables, it means creators must remember which variables are used for which purposes, and not confuse them.

## Passing parameters from TaskBots to MetaBots

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

Create variables with different parameter types to enable bot to bot input and output.

Parameter types:

- None
- Input
- Output
- InputOutput

Based on its parameter type, variables are used as an input parameter, output parameter, or both in TaskBot and MetaBot Logic.

- Input parameters add values to the variable or assign another variable as its value.
- Output parameters assign variables as its value for output to other bots or end users.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Use Credential Vault to store user IDs, passwords, and other sensitive data

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

## Prerequisites

Important: Never hardwire user IDs and passwords as variables in tasks because this introduces a security risk.

## Procedure

1. Log in to the Enterprise Control Room as a Bot Creator.
2. From the left menu, go to ADMINISTRATION > Roles.
3. In the top right corner, click Create role.
4. Enter text in the following fields:
  - Role name
  - Role description (optional)
5. Scroll down to Manage my credentials and lockers and select View and edit ALL credentials attributes value.
6. Click Create role.
7. In the left menu, go to BOTS > Credentials, and select Credentials.
8. Click Create credential.  
Give the credential a name and add attributes for example, username, password, or others, to make it available for use in other TaskBots and MetaBots.
9. Click Create credential.
10. Go to BOTS > Credentials, and click Create locker.  
All available credentials appear under Available Credentials.
11. In the Locker name field, type a name for the locker.
12. Select the credentials that were just created, and add them to the Selected column.
13. Click the CONSUMERS tab.
14. Select roles from the Available roles column and add them to the Selected column.
15. Click Create locker.

## Next steps

Now the Credential is available to use as an input for values in TaskBots and MetaBots.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

Important: Credential variables are not visible until a Enterprise Control Room user with Locker Admin privileges enables the setting in the Enterprise Control Room. When the setting is enabled, credential variables are available for passing as parameters from one TaskBot/MetaBot Logic to another TaskBot/MetaBot Logic. Read [Passing parameters from and to MetaBot Logic](#) for details.

For more information on how to use the Credential Vault, see [Credentials - Overview](#) and [Credential variables](#).

Note: If a TaskBot or MetaBot is run directly from the Enterprise Control Room, the credentials used from the Credential Vault might need to be manually reassigned. For example, if a MetaBot is run from the Enterprise Control Room, open the MetaBot and reassign any input parameters that are stored in the Credential Vault.

Related concepts

[Credentials - Overview](#)

Related information

[Credential variables](#)

## Follow secure coding practices

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

The following list of security checks are generally applicable and relevant for bot creation.

These checks correspond to specific software vulnerabilities identified by the [Open Web Application Security Project \(OWASP\)](#), a not-for-profit organization focused on improving the security of software. Each of the following OWASP issues correspond to specific items included in the [Common Weakness Enumeration \(CWE\)](#), a list of software security vulnerabilities which can occur in software development as provided by MITRE, a nonprofit research and development group.

Developers must consider additional secure coding practices in accordance with the internal security policies of their environments.

OWASP issue	Description	Corresponding CWEs
A1: Injection	Almost any source of data can be an injection vector, environment variables, parameters, external and internal web services, and all types of users. <a href="#">Injection flaws</a> occur when an attacker can send hostile data to an interpreter.	<ul style="list-style-type: none"> <li>CWE-78: Improper Neutralization of Special Elements Used in an OS Command (OS Command Injection)</li> <li>CWE-89: SQL Injection</li> <li>CWE-94: Code Injection</li> <li>CWE-434: Unrestricted Upload of File with Dangerous Type</li> <li>CWE-494: Download of Code Without Integrity Check</li> <li>CWE-829: Inclusion of Functionality from Untrusted Control Sphere</li> </ul>
A2: Broken Authentication	Attackers have access to hundreds of millions of valid username and password combinations for credential stuffing, default administrative account lists, automated brute force, and dictionary attack tools. Session management attacks are well	<ul style="list-style-type: none"> <li>CWE-306: Missing Authentication for Critical Function</li> </ul>

OWASP issue	Description	Corresponding CWEs
	understood, particularly in relation to unexpired session tokens.	<ul style="list-style-type: none"> <li>CWE-307: Improper Restriction of Excessive Authentication Attempts</li> <li>CWE-798: Use of Hard-coded Credentials</li> <li>CWE-807: Reliance on Untrusted Inputs in a Security Decision</li> <li>CWE-862: Missing Authorization</li> <li>CWE-863: Incorrect Authorization</li> </ul>
A3: Sensitive Data Exposure	Rather than directly attacking crypto, attackers steal keys, execute man-in-the-middle attacks, or steal clear text data off the server, when in transit, or from the user's client, such as a browser. A manual attack is generally required. Previously retrieved password databases could be brute forced by Graphics Processing Units (GPUs).	<ul style="list-style-type: none"> <li>CWE-311: Missing Encryption of Sensitive Data</li> <li>CWE-319: Clear text Transmission of Sensitive Information</li> </ul>
A5: Broken Access Control	Exploitation of access control is a core skill of attackers. <a href="#">SAST</a> and <a href="#">DAST</a> tools can detect the absence of access control but cannot verify if it is functional when it is present. Access control is detectable using manual means, or possibly through automation for the absence of access controls in certain frameworks.	<ul style="list-style-type: none"> <li>CWE-73: External Control of File Name or Path</li> <li>CWE-285: Improper Authorization</li> </ul>
A6: Security Misconfiguration	Attackers often attempt to exploit unpatched flaws or access default accounts, unused pages, unprotected files and directories, and so on, to gain unauthorized access or knowledge of the system.	<ul style="list-style-type: none"> <li>CWE-250: Execution with Unnecessary Privileges</li> <li>CWE-676: Use of Potentially Dangerous Function</li> <li>CWE-732: Incorrect Permission Assignment for Critical Resource</li> </ul>
A9: Using Components with Known Vulnerabilities	Although it is easy to find already-written exploits for many known vulnerabilities, other vulnerabilities require a concentrated effort to develop a custom exploit.	<ul style="list-style-type: none"> <li>CWE-190: Integer Overflow or Wraparound</li> <li>CWE-327: Use of a Broken or Risky Cryptographic Algorithm</li> <li>CWE-759: Use of a One-way Hash Without a Salt</li> </ul>

## Error handling

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

When added to a task, the Error Handling allows us to gracefully handle any errors that occur.

Handle errors as follows:

- Take Snapshot: It saves a snapshot of the screen at the moment of the error. A screenshot is sometimes the best way to determine the cause of an error when running on an unattended Bot Runner.
- Run Task: Starts a new Task when an error occurs. This Task can do functions, for example, cleaning up temporary files.
- Log Data into File: Writes a new log entry into the specified log file. This log entry can also contain a time stamp, which is useful for determining exactly when the error occurred. Using the system variables for \$Error Line Number\$ and \$Error Description\$ provides useful data for the log.
- Send Email: Sends an emailed error report which can contain a screenshot of the error (see Take Snapshot) and variable values to help troubleshoot the issue.
- Variable Assignment: Sets a value to a specific variable. This is useful for tracking whether an error occurred in the task, then doing other events, for example, logging task successes and failures.
- Set Task Status: Reports a Fail or Pass condition to the Enterprise Control Room on an error. The Pass condition is useful when an error condition is expected but you want to ignore it and continue.

## Bot Store requirements for error handling

Every bot submitted to the Bot Store must have an error handling mechanism and an error folder structure as follows:

- Create an error folder in the following location:

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder
```

- Under the ErrorFolder, create two subfolders:

- Logs

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Logs
```

- Snapshots

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Snapshots
```

All bot code must handle errors as follows:

- Capture error windows.

Save error window snapshots to the Snapshots folder.

- Log error messages, including a time stamp, to the Logs folder.

Important: .Bot submissions that do not follow error handling requirements are rejected.

In [Naming conventions](#), you learn about naming your Digital Worker and the accompanying files.

Related reference

[Error Handling command](#)

## Bot configuration

It is important to make the configuration of the bot straightforward for end users who are installing it.

Use this recommended approach to create a user-friendlybot configuration:

## User-prompted configuration

- Create a configuration file that a bot calls to initialize variables.
- Create step-by-step end user prompts to capture the required input for any variables.

As a general practice, avoid requiring end users to set variables directly in bots. However, there are instances that require manual configuration by the end user, specifically with MetaBots.

Include guidance to the end user in the Readme file about any manual configuration of variables, or if the bot configuration can be run with just the configuration file. The bot Readme provides details about the Configuration File and any other input files, with the exception of credentials, that are needed for the bot to work.

## Code comments

Remember to liberally comment bot code.

Use the following practices for code commenting:

- Make a block of comments at the beginning of a TaskBot, clearly stating what the bot does.
- Comment complex blocks of code to let developers and users know what was done.

```
1  Comment: ****
2  Comment: It's really a good idea to liberally
3  Comment: comment code.
4  Comment:
5  Comment: Comments help developers remember what
6  Comment: and why something was coded.
7  Comment:
8  Comment: Comments help users understand Bots.
9  Comment:
```

```

10 Comment: There is no such thing as too
11 Comment: many code comments.
12 Comment: ****

```

Automation Anywhere bot code comments are highlighted in green.

## Create a Readme file

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

Each TaskBot (.atmx files) or MetaBot (.mbot files) must have its own Readme file. Each Readme file must include the following:

- Overview: Description of the TaskBot
- Prerequisites:
- Installation steps: Include details about the configuration file and any other input files (except Credentials) that are required for the bot to work.
- Parameter table: Include a table listing parameters that the end user must use to configure the bot. The table must cover the following:
  - Parameter name
  - Type, for example, string or integer
  - Variable direction, for example, input or output

Additional information that describes the parameter.

### Important:

- TaskBot: Include only input parameters required for setting up the TaskBot. Do not list internal variables not required for setup.
- MetaBot: It is important to have parameter tables for input and output variables for MetaBots.

## Other considerations for bot design and development

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

### Hard delays

Avoid using hard delays. The trouble with delays is that they are heavily dependent on the specific computer and its virtual desktop infrastructure (VDI) that the bot runs on. It is better to use commands. For example, use the Wait For Window command if the delay is meant to wait for a window to appear. This removes any dependency on the speed of the VDI.

### Mouse clicks and movement

Avoid mouse movements, scrolling, and clicks in bot development and design. Bots are highly dependent on the display and VDI on which they run. Errors can occur if the screen size is different from the one on which the bot was created.

### Only clean and usable code included in the bot

Do not overcomplicate the bot with unusable code for future development. Remove unusable code and tasks for ease of use by customers.

### Pause task

Avoid pause commands because fully automated and operational bots run autonomously without human interaction, for example, clicking a button to continue.

### Prompts, pauses, and message box commands

Avoid things that require bots to wait for user input. Prompts, pauses, and message box commands stop the bots and MetaBots from running when waiting for user input. Unless user input is required, and a user will definitely be present to provide the input, design the bots without using prompt statements.

### Proper folder structure

Keep related files together. This assists others in understanding which files are related to which bots.

This is particularly important with MetaBots.

### Robustness and flexibility should be achieved

Expect the unexpected. Files change. Web pages change. Try not hardcoding solutions if flexible programming methods accommodate change.

### Screen resolution, default is recommended

Use the default resolution when developing bots. Using nondefault screen resolutions forces users to change their screen resolution to run their TaskBots. No specific default resolution is required, if the resolution of the Bot Creator and the Bot Runner match.

### Use of command according to preferences

There is more than one way to do things. Use the most efficient way of doing things and follow the hierarchy of preferred methods.

### Wild cards should be used with applications

Do not develop bots to work with specific editions of the target application. Instead, use wild cards so that it is applicable to all editions of the application, for example, when using Object Cloning, to identify a window object:

- Use wildcards, for example:

```
Salesforce -* Edition - Internet Explorer
```

- Do not use specific versions or editions, for example:

```
Salesforce - Professional Edition - Internet Explorer
```

### Related concepts

[Build advanced bots with the Enterprise client](#)

### Related tasks

[Create a basic MetaBot](#)

## Checklist for Bot Store submissions

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

Note: This checklist is subject to change without notice. Always review this checklist before submitting bots or Digital Workers to the Bot Store.

Item number:	Item:	Bot submission requirement:
1	Bot naming convention	All bots and Digital Workers must follow this naming convention:

Item number:	Item:	Bot submission requirement:
		<ul style="list-style-type: none"> <li>• BotName-VendorName</li> </ul>
2	Readme naming convention	<p>A Readme must be included. The Readme filename must be in this format:</p> <ul style="list-style-type: none"> <li>• BotName-VendorName-Readme.PDF</li> </ul>
3	Readme file format	Readme files must be submitted only in PDF format.
4	Readme packaging	The Readme.pdf file must be included in the zip file.
5	Zip file: Folder structure	<p>Submit bots or Digital Workers as a single zip file. The file must have the following folder structure:</p> <ul style="list-style-type: none"> <li>• My Tasks</li> <li>• My MetaBots</li> <li>• Error Folder</li> <li>• Input Folder</li> </ul> <p>Note: The Readme.pdf must be included in the root folder of the zip file.</p>
6	Files under each folder	<p>The following file types must be submitted under each of the folders:</p> <ul style="list-style-type: none"> <li>• .atmx files under My Tasks</li> <li>• .mbot files under My MetaBots</li> </ul>
7	Logo	<p>Vendor logos must be submitted in one of the following formats:</p> <ul style="list-style-type: none"> <li>• Scalable Vector Graphics (SVG)</li> <li>• Portable Network Graphics (PNG)</li> </ul>
8	Logo image	Vendor logos must work in any resolution without pixelation.
9	Quick links  Note: Only YouTube links are accepted.	<p>Vendors must submit links for each of the following:</p> <ul style="list-style-type: none"> <li>• A link to a video about the vendor's company</li> <li>• A link to a video about the bot's functionality</li> <li>• Any other helpful links about the submitted bot</li> </ul>

Item number:	Item:	Bot submission requirement:
		Note: Videos must be 5 minutes or shorter.
10	Screenshots	Three screenshots of the bot or Digital Worker are required with the submission. Note: All three screenshots must show the bot or Digital Worker in use.
11	Prerequisites	All bot or Digital Worker software dependencies and prerequisites must be listed. This includes any application or database dependencies. All prerequisites, including specific version numbers, must be included in the list.

## Get certified as a bot developer

Automation Anywhere University provides two options to get certified as an Automation Anywhere bot developer.

### RPA training

The [RPA training: get certified in RPA](#) is designed for Robotic Process Automation (RPA) professionals looking to work with Automation Anywhere and expand their current skills.

- Automation Anywhere essential commands
- Hands-on practice with simple to medium complexity exercises using the Virtual Machine (VM) of Automation Anywhere Enterprise tool.

### Bot Developer Learning Trail and Certification

The [Bot Developer Learning Trail and Certification](#) program includes a series of courses that teach developers how to:

- Identify RPA opportunities
- Understand business requirements
- Develop and deploy automation using Automation Anywhere commands

The course series also covers:

- Process automation involving Citrix and SAP
- A step-by-step approach for deploying bots across machines

Related reference

[Commands](#)

[Using Automation Anywhere Consulting Services](#)

# Build advanced bots with the Enterprise client

Design different types of bots to do different functions and tasks. MetaBots provide dynamic input and output to other bots.

## The role of the MetaBot

Adding a dynamic link library (DLL) to a MetaBot provides a way for bot developers to expose methods that provide dynamic input and output for other bots to use. DLLs allow developers to use a library of functions that can be reused across bots. Managing login activity can be done by a MetaBot that logic and a DLL have been added to.

Using DLLs provides a customizable access that can be managed through the rules based actions of bots. This allows developers to provide dynamic functions without exposing source code.

## DLLs versus Client Commands

When Automation Anywhere [Client Commands](#) are used in conjunction with a MetaBot provide a configurable experience controlled through the MetaBot and other associated bots.

Tip: Automation Anywhere provides a lot of ready to use commands. Read [Client Commands](#) to determine if there are already commands that can be used without the need of creating a DLL.

However, here are scenarios when it's better to create a DLL.

- There is not a client command that does what is needed.
- An existing API provides greater functionality and more efficiency.

Important: All DLLs must be written in C#.

- [Build a simple MetaBot with one DLL](#)

Add a custom DLL to a MetaBot to provide basic input and output to automated tasks and digital workers.

- [Advanced MetaBot with two DLLs](#)

Advanced MetaBots can execute DLLs, libraries, and commands. You can build a MetaBot that interacts with REST APIs using custom DLLs and external libraries.

Related concepts

[MetaBot Overview](#)

[Bots - Overview](#)

Related reference

[Understand the MetaBot Designer](#)

[Bot Creator overview](#)

[Customizing the Enterprise client](#)

[Commands](#)

## Build a simple MetaBot with one DLL

Add a custom DLL to a MetaBot to provide basic input and output to automated tasks and digital workers.

Here is a list of all the necessary tasks to create a simple custom DLL and add that DLL to a MetaBot. Complete the listed tasks in order.

**Step 1: Create a simple DLL**

This task provides the basic steps to create a simple dynamic link library (DLL) that is used in the task for building an advanced bot.

**Step 2: Create a basic MetaBot**

This task guides a bot developer through the steps for creating a MetaBot

**Step 3: Add a DLL to the MetaBot**

Add a single DLL to a MetaBot to enable dynamic input and output.

**Step 4: Add Logic and local variables to a basic MetaBot**

Add MetaBot Logic to define the actions of the MetaBot and how it interacts with other logic and bots.

**Step 5: Manage variables in a basic MetaBot**

Manage the variables created in "Create local variable in a MetaBot."

**Step 6: Assemble a basic MetaBot**

After creating all the logic, variables, and other components of a MetaBot, the pieces need to be assembled to make a functioning MetaBot.

**Step 7: Verify a basic MetaBot works**

Run the MetaBot created in this task to verify that it works as expected.

Related concepts

[MetaBot Overview](#)

[Bots - Overview](#)

Related reference

[Understand the MetaBot Designer](#)

[Bot Creator overview](#)

[Customizing the Enterprise client](#)

[Commands](#)

## Create a simple DLL

This task provides the basic steps to create a simple dynamic link library (DLL) that is used in the task for building an advanced bot.

## Prerequisites

There are some prerequisites for this task:

- Basic understanding and experience with programming
- Access to an Integrated Development Environment (IDE) to develop code examples as a DLL that supports C#. An example of an IDE is [Microsoft Visual Studio Community Edition](#)
- Access to an Automation Anywhere Enterprise client
- Bot Creator permission
- A decent understanding of the Automation Anywhere RPA platform, including basic understanding of TaskBots, MetaBots, and what they do.

Tip: Check out [Build a basic bot using the Enterprise client](#) to understand how to build a bot.

The examples in this task are based on [Microsoft Visual Studio Community Edition](#).

## Procedure

1. Create a New Project in C#.

In Microsoft Visual Studio create a project and a solution and used the following names.

a) Project name: `MyApp4Lib`

b) Solution name: MyApp4MetaBot

The Project is part of the Solution. This gives the flexibility of adding other projects to the solution. In the code that follows, "MyApp4Lib" will be the Namespace. A namespace in C# is used to organize programs.

2. Create a public class called `VisibleBotMethods`.

Methods that are created in DLLs for use by bots can perform tasks, such as, making a REST call, integrating with other DLLs, or running a database SQL call. Below is a basic code example.

3. Copy the following code and paste it into your project.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace MyApp4Lib
{
    public class VisibleBotMethods
    {
        public String SayHiTo(String Name)
        {
            String MyMessage = "Hi There, " + Name;
            return MyMessage;
        }

        public String SayByeTo(String Name)
        {
            String MyMessage = "Goodbye " + Name;
            return MyMessage;
        }
    }
}
```

This code example has two methods in the `VisibleBotMethods` class. Both methods take a string name and return another string. One method returns a string with "Hi there" plus a name. The other returns "Goodbye."

4. Compile the code to create a DLL.

Important: Name the DLL "MyApp4Lib.dll." The DLL created in this task is used in the [Create a basic MetaBot](#) task.

## Next steps

The DLL created in this task is added to a MetaBot in the [Add Logic and local variables to a basic MetaBot](#) task.

Related tasks

[Create a basic MetaBot](#)

[Add Logic and local variables to a basic MetaBot](#)

[Manage variables in a basic MetaBot](#)

[Assemble a basic MetaBot](#)

[Verify a basic MetaBot works](#)

### Create a basic MetaBot

This task guides a bot developer through the steps for creating a MetaBot.

### Prerequisites

The [Create a simple DLL](#) task must be completed successfully before you can complete this task, including a functional DLL.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

### Procedure

1. Open the Automation Anywhere Enterprise client.
2. Click the MetaBots tab.
3. Click New.
4. In the MetaBot Name field enter `MyApp4MetaBot`.
5. Click the radio button All Applications.  
This MetaBot does not need to be application specific.
6. Click Create.

## Next steps

To add logic to the MetaBot created in this task, read [Add a DLL to the MetaBot](#).

Related tasks

[Create a simple DLL](#)

[Add Logic and local variables to a basic MetaBot](#)

[Manage variables in a basic MetaBot](#)

[Assemble a basic MetaBot](#)

[Verify a basic MetaBot works](#)

### Add a DLL to the MetaBot

Add a single DLL to a MetaBot to enable dynamic input and output.

## Prerequisites

The [Create a basic MetaBot](#) task must be completed successfully before you can complete this task.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

This task starts in the Automation Anywhere Enterprise client on the MetaBots tab.

## Procedure

1. From the Enterprise client, open the `MyApp4MetaBot.mbot` in the My MetaBots list.  
The MetaBot Designer window opens.
2. Open the ASSETS tab.
3. Click Add Dll on the MetaBot Designer tool ribbon.  
This is the DLL that was created earlier.
4. Locate and select the `MyApp4Lib.dll`.
5. Click Open.  
The DLL is now added to the MetaBot ASSETS tab.

## Next steps

MetaBots need to have logic to handle how the DLLs and commands interact, read [Add Logic and local variables to a basic MetaBot](#).

### Add Logic and local variables to a basic MetaBot

Add MetaBot Logic to define the actions of the MetaBot and how it interacts with other logic and bots.

## Prerequisites

The [Add a DLL to the MetaBot](#) task must be completed successfully before you can complete this task.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

## Procedure

1. From the Enterprise client, open the `MyApp4MetaBot.mbot` in the My MetaBots list.  
The MetaBot Designer is opened.
2. Click the LOGIC tab.
3. Click Add Logic.

- A Workbench window opens with a tab named NewLogic1. The DLL MyApp4Lib.dll and its classes are visible.
4. Click New.
  5. Select MyApp4MetaBot.mbot and click Create.
  6. Click VARIABLE MANAGER.
  7. Click Add.
  8. In the Add Variable dialog, select **Input** from the Parameter Type drop down list.
  9. Enter **MyInputName** in the Name field.
  10. Click Save.  
Important: A message window appears stating that the variable has a "null" value. The value does not need to be set now.
  11. Repeat the necessary steps to create the local variable **MyMessage**:
    - Parameter Type = Output
    - Name = **MyMessage**
  12. In the Workbench, click Save.
  13. Enter **SayHiTo** in the Logic Name field.
  14. Click Save.

## Next steps

To add variables to the MetaBot logic created in this task, read [Manage variables in a basic MetaBot](#).

Related tasks

[Create a simple DLL](#)

[Create a basic MetaBot](#)

[Assemble a basic MetaBot](#)

[Verify a basic MetaBot works](#)

## Manage variables in a basic MetaBot

Manage the variables created in "Create local variable in a MetaBot."

## Prerequisites

The [Add Logic and local variables to a basic MetaBot](#) task must be completed successfully before you can complete this task.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

## Procedure

1. Open the LOGIC created in [Add Logic and local variables to a basic MetaBot](#).
2. Click String SayHiTo(String Name).  
Tip: Adjust the columns inside under Actions List so that the Class and list methods are visible.
3. Expand the MyApp4Lib.dll in the Dll pane.

VisibleBotMethods contains a list of all the methods included in the MyApp4Lib.dll.

4. In the Class pane, click String SayHiTo(String Name).
- A dialog with the title "SayHiTo" pops up.
5. Enter "Bob Smith" in the Value field.
6. Select the check box next to Assign output to variable.
7. Select MyMessage from the drop down list.
8. Click Add.
9. Click Save.

## Next steps

To assemble the MetaBot created in [Create a basic MetaBot](#), read [Assemble a basic MetaBot](#).

Related concepts

[User defined variables](#)

Related tasks

[Create a simple DLL](#)

[Create a basic MetaBot](#)

[Add Logic and local variables to a basic MetaBot](#)

[Assemble a basic MetaBot](#)

[Verify a basic MetaBot works](#)

## Assemble a basic MetaBot

After creating all the logic, variables, and other components of a MetaBot, the pieces need to be assembled to make a functioning MetaBot.

## Prerequisites

The [Manage variables in an advanced MetaBot](#) task must be completed successfully before you can complete this task.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

## Procedure

1. Open the LOGIC created in [Add Logic and local variables to a basic MetaBot](#).
2. From the Workbench Commands tab, drag the Variable Operation command and drop it on the "Execute 'SayHiTo' task."
3. Under Specify Variable, select MyInputName
4. In the Variable Operation dialog, click in the Specify value field.
5. Press the F2 key to open the insert variable dialog.
6. Select MyInputName and click Insert.
7. Click Save.
8. Move the Variable Operation to the top of the task.
9. Drag and drop the Message Box command to the Actions List.
10. Click in the Please enter message to show the user field.

- 
11. Press the F2 key to open the Insert Variable dialog.
  12. Select MyMessage and click Insert.
  13. Click Save in the Message Box dialog window.
  14. Click Save in the Workbench.

## Next steps

To verify that the MetaBot created in [Create a basic MetaBot](#) works as expected, read [Verify a basic MetaBot works](#).

Related concepts

[User defined variables](#)

Related tasks

[Create a simple DLL](#)

[Create a basic MetaBot](#)

[Add Logic and local variables to a basic MetaBot](#)

[Manage variables in a basic MetaBot](#)

[Verify a basic MetaBot works](#)

## Verify a basic MetaBot works

Run the MetaBot created in this task to verify that it works as expected.

## Prerequisites

The [Assemble a basic MetaBot](#) task must be completed successfully before you can complete this task.

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

## Procedure

1. Open the LOGIC created in [Add Logic and local variables to a basic MetaBot](#).
2. Click Run in the top menu bar.
3. Click OK to dismiss the open windows.

MetaBots can be used with other bots created using the Automation Anywhere Enterprise client.

Here is a summary of the key learning points:

- Created a DLL which has methods for execution
- Added the DLL as an asset to a MetaBot
- Added Logic to perform the operation
- Used Action Items in the MetaBot to call the method, generate a return, and output the results

Related tasks

[Create a simple DLL](#)

[Create a basic MetaBot](#)

- 
- [Add Logic and local variables to a basic MetaBot](#)
  - [Manage variables in a basic MetaBot](#)
  - [Assemble a basic MetaBot](#)

## Advanced MetaBot with two DLLs

Advanced MetaBots can execute DLLs, libraries, and commands. You can build a MetaBot that interacts with REST APIs using custom DLLs and external libraries.

Follow the tasks below to build and test a MetaBot that uses multiple DLLs to make REST API calls and display a response.

Important: [Microsoft Visual Studio Community Edition](#) was used to compile the examples in this task. To successfully compile the DLLs in this task using [Microsoft Visual Studio Community Edition](#), install the [RestSharp](#) package.

Complete the following tasks in the order they are presented below.

### [Step 1: Build and test DLLs](#)

Build DLLs that call a REST API to return the latest price of bitcoin in US dollars and Euros.

### [Step 2: Create an advanced MetaBot](#)

Create a MetaBot that manages multiple DLLs and commands.

### [Step 3: Add multiple DLLs to a MetaBot](#)

Add more than one DLL to a MetaBot.

### [Step 4: Add logic and variables to an advanced MetaBot](#)

Add Logic to define the MetaBot actions. MetaBots can include multiple commands and DLLs.

### [Step 5: Manage variables in an advanced MetaBot](#)

Manage the variables created in "Create local variable in a MetaBot."

### [Step 6: Assemble an advanced MetaBot](#)

After creating all the logic, variables, and other components of a MetaBot, combine them to assemble a valid MetaBot.

### [Step 7: Verify an advanced MetaBot output](#)

From the Workbench, select a MetaBot and click Run to verify that it executes correctly.

#### Related information

<https://github.com/restsharp/RestSharp>

<https://www.nuget.org/packages/RestSharp>

<https://www.nuget.org/>

## Build and test DLLs

Build DLLs that call a REST API to return the latest price of bitcoin in US dollars and Euros.

## Prerequisites

- Basic understanding and experience with programming
- Access to an Integrated Development Environment (IDE) to develop code examples as a DLL that supports C#. An example of an IDE is [Microsoft Visual Studio Community Edition](#)
- Access to an Automation Anywhere Enterprise client

- Bot Creator permission
  - A decent understanding of the Automation Anywhere RPA platform, including basic understanding of TaskBots, MetaBots, and what they do.
- Tip: Check out [Build a basic bot using the Enterprise client](#) to understand how to build a bot.

There are four programs that are part of the broader solution MyApp4Lib. Input and build this sample code.

Two DLLs are created:

- MyApp4Lib.dll
- RestSharp.dll

## Procedure

1. Compile the code that is used to test the methods.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;
using MyApp4Lib;

namespace MyApp4Test
{
    class Program // Test program for the classes
    {
        static void Main(string[] args)
        {
            VisibleBotMethods vbm = new VisibleBotMethods();
            String UsdPrice = vbm.GetPriceOfBitcoin("usd");
            Console.WriteLine("\nPrice of Bitcoin in USD: " + UsdPrice);
            Console.ReadKey();
        }
    }
}
```

2. Compile the code that orchestrates the REST call and retrieves the bitcoin price.

```
using System;
using System.Collections.Generic;
using System.Linq;
```

```

using System.Text;
using System.Threading.Tasks;
namespace MyApp4Lib
{
    public class VisibleBotMethods
    {
        public String GetPriceOfBitcoin(String Currency)
        {
            // Make GET call -- the Currency is the variable:
            // usd for $Dollars, eur for Euros
            String URL = "https://api.cryptonator.com/api/ticker/btc-" + C
            urrency;

            // Instantiate objects
            RestUtils ru = new RestUtils();
            JsonUtils ju = new JsonUtils();

            // Make the REST call and return the JSON response
            String JsonResp = ru.CallRestGETNoAuth(URL);

            // Retrieve just the price from the JSON as a String
            String BCPrice = ju.GetDataFromJsonResponse(JsonResp);
            return BCPrice;
        }
    }
}

```

3. Compile the methods to make REST calls.

```

using System;
using System.Collections.Generic;
using System.Linq;
using System.Net;
using System.Text;
using System.Threading.Tasks;

namespace MyApp4Lib

```

```

{
    public class RestUtils
    {
        public String CallRestGETNoAuth(String URL)
        {
            // Setting up a web request on the URL that we pass as a parameter

            // specifying a GET request for a JSON response
            System.Net.HttpWebRequest httpWebRequest = (HttpWebRequest)WebRequest.Create(URL);

            httpWebRequest.ContentType = "text/json";
            httpWebRequest.Method = "GET";

            // Submitting the request, getting the response, turning it in
            to a string,
            // and returning the response
            try
            {
                var httpResponse = (HttpWebResponse)httpWebRequest.GetResponse();
                using (var streamReader = new System.IO.StreamReader(httpResponse.GetResponseStream()))
                {
                    var result = streamReader.ReadToEnd();
                    return result;
                }
            }
            catch (System.Net.WebException e) // Catch error if URL is no
            t valid
            {
                return "Error:" + e.Message;
            }
        }
    }
}

```

4. Compile the code that processes the JSON response and returns the bitcoin price.

```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Threading.Tasks;

namespace MyApp4Lib
{
    class JsonUtils // Includes methods to process JSON
    {
        public String GetDataFromJsonResponse(String JsonResp)
        {
            RestSharp.RestResponse response = new RestSharp.RestResponse();

            response.Content = JsonResp;

            // Turning JSON structure into object / class structure
            JsonSerializer deserial = new JsonSerializer();
            StdJsonResponseForCurrCheck x = deserial.Deserialize<StdJsonResponseForCurrCheck>(response);

            String Resp = "";

            // Identifying price within the class structure, and then return it
            Resp = x.ticker.price;
            return Resp;
        }

        // Taking JSON response and turning it into classes
        public class Ticker
        {
            public string @base { get; set; }
            public string target { get; set; }
            public string price { get; set; }
            public string volume { get; set; }
            public string change { get; set; }
        }
    }
}
```

```

    }

    public class StdJsonResponseForCurrCheck
    {
        public Ticker ticker { get; set; }
        public int timestamp { get; set; }
        public bool success { get; set; }
        public string error { get; set; }
    }
}

```

## Next steps

Add the DLLs created in this task to a MetaBot in [Create an advanced MetaBot](#).

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

## Create an advanced MetaBot

Create a MetaBot that manages multiple DLLs and commands.

## Prerequisites

Verify your accesses and permissions before starting this task:

- Access to the DLLs created in the [Build and test DLLs](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

Complete the [Build and test DLLs](#) task before starting this task, including creating functional DLLs.

## Procedure

1. Open the Automation Anywhere Enterprise client.
2. Click the MetaBots tab.
3. Click New.
4. In the MetaBot Name field type **CryptoCurrencyBot**.
5. Click the radio button All Applications.  
This MetaBot does not need be application specific.

- 
6. Click Create.

## Next steps

To add Logic to this MetaBot, go to the [Add multiple DLLs to a MetaBot](#) task.

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

[Add multiple DLLs to a MetaBot](#)

Add more than one DLL to a MetaBot.

## Prerequisites

- Access to the Automation Anywhere Enterprise client.
- Access to the DLLs created in the [Build and test DLLs](#) task.

Complete the [Create an advanced MetaBot](#) task before starting this task.

## Procedure

1. From the Enterprise client, open the CryptoCurrencyBot.mbot in the My MetaBots list.  
The MetaBot Designer window opens.
  2. Open the ASSETS tab.
  3. Click Add Dll on the MetaBot Designer tool ribbon.
  4. Locate and select the `MyApp4Lib.dll`.
  5. Click Open.
  6. Click Add Dll.
  7. Locate and select the `RestSharp.dll`.
  8. Click Open.
- Both DLLs are now added to the MetaBot  
Important: Each DLL must be added individually.

## Next steps

Next add logic and variables, go to [Add Logic and variables to an advanced MetaBot](#)

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

---

[Assemble an advanced MetaBot](#)  
[Verify an advanced MetaBot output](#)

## Add Logic and variables to an advanced MetaBot

Add Logic to define the MetaBot actions. MetaBots can include multiple commands and DLLs.

## Prerequisites

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

Complete the [Add multiple DLLs to a MetaBot](#) task before starting this task.

## Procedure

1. From the Enterprise client, open the CryptoCurrencyBot.mbot in the My MetaBots list.  
The MetaBot Designer is opened.
2. Click the LOGIC tab.
3. Click Add Logic.  
A Workbench window opens with a tab named NewLogic1. The DLLs MyApp4Lib.dll and RestSharp.dll are visible.
4. Click New in the Workbench menu ribbon.
5. Select CryptoCurrencyBot.mbot and click Create.
6. Click VARIABLE MANAGER.
7. Click Add.
8. In the Add Variable dialog, select  
**Input**  
from the Parameter Type drop down list.
9. Enter **Currency** in the Name field.
10. Verify that Create New Variable is selected.
11. In the Value field, enter  
**USD**
12. Click Save.  
Important: If a message window appears stating that the variable has a "null" value, click OK. The value does not need to be set now.
13. Repeat the above steps to create the local variable **Price**:
  - Parameter Type = Output
  - Name = **Price**
  - Value = **USD**
14. In the Workbench, click Save.
15. Enter **Get Bitcoin Price in USD** in the Logic Name field.
16. Click Save.

## Next steps

After creating variables, assign value to them, go to [Manage variables in an advanced MetaBot](#).

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

[Manage variables in an advanced MetaBot](#)

Manage the variables created in "Create local variable in a MetaBot."

## Prerequisites

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

Complete the [Add Logic and variables to an advanced MetaBot](#) before starting this task.

## Procedure

1. Open the LOGIC created in [Add Logic and variables to an advanced MetaBot](#).
2. Click Get Bitcoin Price in USD.  
Tip: Adjust the columns inside under Actions List so that the Class and list methods are visible.
3. Expand the MyApp4Lib.dll in the DLL pane.  
VisibleBotMethods contains a list of all the methods included in the MyApp4Lib.dll.  
Tip: If MyApp4Lib.dll is not visible, click Next or Previous to see other DLLs in the MetaBot.
4. Expand MyApp4Lib.dll and MyApp4Lib, and then select VisibleBotMethods.
5. In the Class pane, click String GetPriceOfBitcoin(String Currency).  
A dialog with the title Get Bitcoin Price in USD pops up.
6. Click in the Value field.
7. Press F2.
8. Select Currency from the list of variables.
9. Click Insert.
10. Select the check box next to Assign output to variable.
11. Select Price from the drop down list.
12. Click Add.
13. Click Save in the Client menu banner.

## Next steps

Combine all the steps to make the MetaBot work, go to [Assemble an advanced MetaBot](#).

---

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

## Assemble an advanced MetaBot

After creating all the logic, variables, and other components of a MetaBot, combine them to assemble a valid MetaBot.

## Prerequisites

Verify your accesses and permissions before starting this task:

- Access to the DLL created in the [Create a simple DLL](#) task.
- Access to the Automation Anywhere Enterprise client.
- AAE\_MetaBot Designer permission and access, see [System created roles](#) for more information about roles and permissions.

Complete the [Manage variables in an advanced MetaBot](#) task before starting this task.

## Procedure

1. Open the LOGIC created in [Add Logic and local variables to a basic MetaBot](#) Get Bitcoin Price in USD.
2. From the Commands tab, drag and drop a Message Box command from the left navigation pane to the Actions List just below number 1.
3. In the Message Box under the Please enter message to show the user field.
4. Enter Price of Bitcoin is.
5. Press F2, and select Price.
6. Click Insert.
7. Click Save.
8. Click Save in the Workbench.

## Next steps

To verify that the MetaBot use the [Verify an advanced MetaBot output](#) task.

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

## Verify an advanced MetaBot output

From the Workbench, select a MetaBot and click Run to verify that it executes correctly.

## Prerequisites

Complete the [Assemble an advanced MetaBot](#) task before you start this task.

The Logic is the logical container that processes a bot workflow.

## Procedure

1. Open the LOGIC created in [Add Logic and variables to an advanced MetaBot](#).
2. Click Run in the top menu bar.
3. Click OK to dismiss the open windows.

## Next steps

Read [Advanced MetaBot summary and best practices](#) for details about what was learned in this task.

Related concepts

[Advanced MetaBot summary and best practices](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

## Advanced MetaBot summary and best practices

In this task 2 DLLs were integrated into a MetaBot and Logic was developed to perform operations with an external library and REST API.

## Why use MetaBots?

- Create independent, highly reusable automation blueprints of applications, DLLs, and commands facilitated by automation Logic.
- Leverage the MetaBot library to rapidly standardize org-wide automation.
- Ensure systematic, accelerated automation return on investment (ROI).
- Eliminate common navigational errors in complex automation tasks.
- Automate without requiring access to live application.
- Calibrate newer versions of applications used in a MetaBot to ensure compatibility.

## Best practices for developing DLLs to use in MetaBots

- Test the DLL code in an integrated development environment (IDE) before integrating the DLL into a MetaBot.
- Debugging code in an IDE is much faster than debugging it in the Automation Anywhere Enterprise client.

---

Related concepts

[MetaBot Overview](#)

Related tasks

[Build and test DLLs](#)

[Create an advanced MetaBot](#)

[Add multiple DLLs to a MetaBot](#)

[Add Logic and variables to an advanced MetaBot](#)

[Manage variables in an advanced MetaBot](#)

[Assemble an advanced MetaBot](#)

[Verify an advanced MetaBot output](#)

## Recommended standards for bot design, creation, and submission

This content provides guidance for bot developers throughout the entire process of bot development from designing and creating bots through posting them to the Bot Store.

Read the following sections to gain a better understanding of each of the topics.

- [Start with Sample bot from Bot Store](#)

In order to assist bot and Digital Worker developers in creating high quality software, the bot package submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

- [Enable bots to run on other computers](#)

Bot developers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

- [Modular Bots are a must](#)

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

- [Use variables liberally](#)

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

- [Variable names](#)

Automation Anywhere has a recommended variable naming convention.

- [Passing parameters from TaskBots to MetaBots](#)

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

- [Use Credential Vault to store user IDs, passwords, and other sensitive data](#)

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

- [Follow secure coding practices](#)

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

- [Error handling](#)

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

- [Bot configuration](#)

It is important to make the configuration of the bot straightforward for end users who are installing it.

- [Code comments](#)

Remember to liberally comment bot code.

- [Create a Readme file](#)

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

- [Other considerations for bot design and development](#)

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

- [Checklist for Bot Store submissions](#)

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

Related concepts

[Build a basic bot using the Enterprise client](#)

[Build advanced bots with the Enterprise client](#)

[Why Build on Automation Anywhere?](#)

[Recommended standards for bot design, creation, and submission](#)

## Start with Sample bot from Bot Store

In order to assist bot and Digital Worker developers in creating high quality software, the bot package submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

Use the checklist for Bot Store submissions [Checklist for Bot Store submissions](#) and follow the Bot Store submission requirements. All requirements in this checklist must be met for a bot or a Digital Digital Worker Bot Store package submissions.

The checklist also provides the Readme Template example, as well as, Best Practice examples for a individual bot or a Digital Worker.

## Enable bots to run on other computers

Botdevelopers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

During the development of new bots, developers often point to local copies of files and attachments. This works great if the bot is only run on the developers' local computers. A local path looks something like this:

```
C:\Users\UserName\Documents...
```

Bot Runners are unattended computers (physical or virtual computers) whose job is to run the tasks presented to them. Because these Bot Runners have their own account login credentials, localized paths do not work.

The system variable \$AAApplicationPath\$ resolves this problem.

Local path during development:

```
C:\Users\UserName\Documents\Automation Anywhere Files\Automation Anywhere\My Docs\accounts.xlsx
```

Relative path that works in Bot Runner:

```
$AAApplicationPath$\Automation Anywhere\My Docs\accounts.xlsx
```

Not only does this make the path shorter, but it also makes the bot portable. When preparing a TaskBot to work with Bot Runner or a co-worker's computer, use the \$AAApplicationPath\$ anywhere that points to a local file.

**Tip:** Create variables, for example, "vPath," then use the Variable Operation with \$AAApplicationPath\$ to make the paths short and manageable.

## Modular Bots are a must

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

As with any object-oriented approach to programming, creating separate bots for each distinct function makes the code easier to understand, update, and reuse. Customers can more easily pick and choose the best components to include in their business process automation.

For example, these are typical steps to automate in a process:

1. Log in.
2. Create Lead.
3. Log out.

Each of these steps should be divided into unique TaskBots (.atmx files). Create a Master Bot to use for each of the three tasks in the correct order.

Consider creating and using MetaBots for common processes and tasks. MetaBots encapsulate assets and logic used in common processes and tasks, making those processes and tasks reusable by other bots. Over time a library of functions and tasks can be contained in MetaBots which are reusable by TaskBots. This avoids the need to create redundant functionality in multiple bots.

MetaBots are used to encapsulate logic inside a DLL, allowing bot developers to hide complex tasks and processes from users. Following are the high-level steps for adding a DLL to a MetaBot:

1. Create a DLL that does the respective function.
2. Add the DLL as an asset in the MetaBot Designer.
3. Add Logic to do the operation.
4. Use the MetaBot in other bots to do the task.

Related concepts

[Build a simple MetaBot with one DLL](#)

[Advanced MetaBot with two DLLs](#)

## Use variables liberally

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

Create new variables for an automation from the Variable Manager. The Variable Manager shows the local variables that are defined for each specific task. To create a new user variable, follow these steps:

### Procedure

1. Go to Workbench > Variable Manager.
2. In the Variable Manager, click Add at the bottom or right-click an existing variable and select Add.  
  
In the Add Variable window, the Create New Variable option is selected by default.
3. Select a Variable Type.  
Enter a name and select the method for determining the value of the variable.

### Next steps

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Variable names

Automation Anywhere has a recommended variable naming convention.

- Variables start with "v", such as vPath.
- Lists start with "lst", such as lstMyList.
- Arrays start with "arr", such as arrPirateBooty.
- Randoms start with "rdm", such as rdmChoice.

Some developers prefer to add variable "type" prefixes to the front of their variables, for example:

- "int" for variables expected to hold whole numbers (integers)
- "str" for variables expected to hold a string of characters

Regardless of the naming scheme, variables in Automation Anywhere do not have a strong type.

This means, a variable that contains a number, then does a mathematical calculation, can later contain a string value. This is called loose typing. Although it adds flexibility when working with variables, it means creators must remember which variables are used for which purposes, and not confuse them.

## Passing parameters from TaskBots to MetaBots

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

Create variables with different parameter types to enable bot to bot input and output.

Parameter types:

- None
- Input
- Output
- InputOutput

Based on its parameter type, variables are used as an input parameter, output parameter, or both in TaskBot and MetaBot Logic.

- Input parameters add values to the variable or assign another variable as its value.
- Output parameters assign variables as its value for output to other bots or end users.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Use Credential Vault to store user IDs, passwords, and other sensitive data

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

### Prerequisites

Important: Never hardwire user IDs and passwords as variables in tasks because this introduces a security risk.

### Procedure

1. Log in to the Enterprise Control Room as a Bot Creator.
2. From the left menu, go to ADMINISTRATION > Roles.
3. In the top right corner, click Create role.
4. Enter text in the following fields:
  - Role name
  - Role description (optional)
5. Scroll down to Manage my credentials and lockers and select View and edit ALL credentials attributes value.

6. Click Create role.
7. In the left menu, go to BOTS > Credentials, and select Credentials.
8. Click Create credential.  
Give the credential a name and add attributes for example, username, password, or others, to make it available for use in other TaskBots and MetaBots.
9. Click Create credential.
10. Go to BOTS > Credentials, and click Create locker.  
All available credentials appear under Available Credentials.
11. In the Locker name field, type a name for the locker.
12. Select the credentials that were just created, and add them to the Selected column.
13. Click the CONSUMERS tab.
14. Select roles from the Available roles column and add them to the Selected column.
15. Click Create locker.

## Next steps

Now the Credential is available to use as an input for values in TaskBots and MetaBots.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

Important: Credential variables are not visible until a Enterprise Control Room user with Locker Admin privileges enables the setting in the Enterprise Control Room. When the setting is enabled, credential variables are available for passing as parameters from one TaskBot/MetaBot Logic to another TaskBot/MetaBot Logic. Read [Passing parameters from and to MetaBot Logic](#) for details.

For more information on how to use the Credential Vault, see [Credentials - Overview](#) and [Credential variables](#).

Note: If a TaskBot or MetaBot is run directly from the Enterprise Control Room, the credentials used from the Credential Vault might need to be manually reassigned. For example, if a MetaBot is run from the Enterprise Control Room, open the MetaBot and reassign any input parameters that are stored in the Credential Vault.

Related concepts

[Credentials - Overview](#)

Related information

[Credential variables](#)

## Follow secure coding practices

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

The following list of security checks are generally applicable and relevant for bot creation.

These checks correspond to specific software vulnerabilities identified by the [Open Web Application Security Project \(OWASP\)](#), a not-for-profit organization focused on improving the security of software. Each of the following OWASP issues correspond to specific items included in the [Common Weakness Enumeration](#)

([CWE](#)), a list of software security vulnerabilities which can occur in software development as provided by MITRE, a nonprofit research and development group.

Developers must consider additional secure coding practices in accordance with the internal security policies of their environments.

OWASP issue	Description	Corresponding CWEs
A1: Injection	Almost any source of data can be an injection vector, environment variables, parameters, external and internal web services, and all types of users. <a href="#">Injection flaws</a> occur when an attacker can send hostile data to an interpreter.	<ul style="list-style-type: none"> <li>• CWE-78: Improper Neutralization of Special Elements Used in an OS Command (OS Command Injection)</li> <li>• CWE-89: SQL Injection</li> <li>• CWE-94: Code Injection</li> <li>• CWE-434: Unrestricted Upload of File with Dangerous Type</li> <li>• CWE-494: Download of Code Without Integrity Check</li> <li>• CWE-829: Inclusion of Functionality from Untrusted Control Sphere</li> </ul>
A2: Broken Authentication	Attackers have access to hundreds of millions of valid username and password combinations for credential stuffing, default administrative account lists, automated brute force, and dictionary attack tools. Session management attacks are well understood, particularly in relation to unexpired session tokens.	<ul style="list-style-type: none"> <li>• CWE-306: Missing Authentication for Critical Function</li> <li>• CWE-307: Improper Restriction of Excessive Authentication Attempts</li> <li>• CWE-798: Use of Hard-coded Credentials</li> <li>• CWE-807: Reliance on Untrusted Inputs in a Security Decision</li> <li>• CWE-862: Missing Authorization</li> <li>• CWE-863: Incorrect Authorization</li> </ul>
A3: Sensitive Data Exposure	Rather than directly attacking crypto, attackers steal keys, execute man-in-the-middle attacks, or steal clear text data off the server, when in transit, or from the user's client, such as a browser. A manual attack is generally required. Previously retrieved password databases could be brute forced by Graphics Processing Units (GPUs).	<ul style="list-style-type: none"> <li>• CWE-311: Missing Encryption of Sensitive Data</li> <li>• CWE-319: Clear text Transmission of Sensitive Information</li> </ul>

OWASP issue	Description	Corresponding CWEs
A5: Broken Access Control	Exploitation of access control is a core skill of attackers. <a href="#">SAST</a> and <a href="#">DAST</a> tools can detect the absence of access control but cannot verify if it is functional when it is present. Access control is detectable using manual means, or possibly through automation for the absence of access controls in certain frameworks.	<ul style="list-style-type: none"> <li>CWE-73: External Control of File Name or Path</li> <li>CWE-285: Improper Authorization</li> </ul>
A6: Security Misconfiguration	Attackers often attempt to exploit unpatched flaws or access default accounts, unused pages, unprotected files and directories, and so on, to gain unauthorized access or knowledge of the system.	<ul style="list-style-type: none"> <li>CWE-250: Execution with Unnecessary Privileges</li> <li>CWE-676: Use of Potentially Dangerous Function</li> <li>CWE-732: Incorrect Permission Assignment for Critical Resource</li> </ul>
A9: Using Components with Known Vulnerabilities	Although it is easy to find already-written exploits for many known vulnerabilities, other vulnerabilities require a concentrated effort to develop a custom exploit.	<ul style="list-style-type: none"> <li>CWE-190: Integer Overflow or Wraparound</li> <li>CWE-327: Use of a Broken or Risky Cryptographic Algorithm</li> <li>CWE-759: Use of a One-way Hash Without a Salt</li> </ul>

## Error handling

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

When added to a task, the Error Handling allows us to gracefully handle any errors that occur.

Handle errors as follows:

- Take Snapshot: It saves a snapshot of the screen at the moment of the error. A screenshot is sometimes the best way to determine the cause of an error when running on an unattended Bot Runner.
- Run Task: Starts a new Task when an error occurs. This Task can do functions, for example, cleaning up temporary files.
- Log Data into File: Writes a new log entry into the specified log file. This log entry can also contain a time stamp, which is useful for determining exactly when the error occurred. Using the system variables for \$Error Line Number\$ and \$Error Description\$ provides useful data for the log.
- Send Email: Sends an emailed error report which can contain a screenshot of the error (see Take Snapshot) and variable values to help troubleshoot the issue.

- Variable Assignment: Sets a value to a specific variable. This is useful for tracking whether an error occurred in the task, then doing other events, for example, logging task successes and failures.
- Set Task Status: Reports a Fail or Pass condition to the Enterprise Control Room on an error. The Pass condition is useful when an error condition is expected but you want to ignore it and continue.

## Bot Store requirements for error handling

Every bot submitted to the Bot Store must have an error handling mechanism and an error folder structure as follows:

- Create an error folder in the following location:

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder
```

- Under the ErrorFolder, create two subfolders:
  - Logs

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Logs
```

- Snapshots

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Snapshots
```

All bot code must handle errors as follows:

- Capture error windows.  
Save error window snapshots to the Snapshots folder.
- Log error messages, including a time stamp, to the Logs folder.

Important: .Bot submissions that do not follow error handling requirements are rejected.

In [Naming conventions](#), you learn about naming your Digital Worker and the accompanying files.

Related reference

[Error Handling command](#)

## Bot configuration

It is important to make the configuration of the bot straightforward for end users who are installing it.

Use this recommended approach to create a user-friendlybot configuration:

### User-prompted configuration

- Create a configuration file that a bot calls to initialize variables.
- Create step-by-step end user prompts to capture the required input for any variables.

As a general practice, avoid requiring end users to set variables directly in bots. However, there are instances that require manual configuration by the end user, specifically with MetaBots.

Include guidance to the end user in the Readme file about any manual configuration of variables, or if the bot configuration can be run with just the configuration file. The bot Readme provides details about the Configuration File and any other input files, with the exception of credentials, that are needed for the bot to work.

## Code comments

Remember to liberally comment bot code.

Use the following practices for code commenting:

- Make a block of comments at the beginning of a TaskBot, clearly stating what the bot does.
- Comment complex blocks of code to let developers and users know what was done.

```
1  Comment: ****
2  Comment: It's really a good idea to liberally
3  Comment: comment code.
4  Comment:
5  Comment: Comments help developers remember what
6  Comment: and why something was coded.
7  Comment:
8  Comment: Comments help users understand Bots.
9  Comment:
10 Comment: There is no such thing as too
11 Comment: many code comments.
12 Comment: ****
```

Automation Anywhere bot code comments are highlighted in green.

## Create a Readme file

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

Each TaskBot (.atmx files) or MetaBot (.mbot files) must have its own Readme file. Each Readme file must include the following:

- Overview: Description of the TaskBot
- Prerequisites:

- Installation steps: Include details about the configuration file and any other input files (except Credentials) that are required for the bot to work.
- Parameter table: Include a table listing parameters that the end user must use to configure the bot. The table must cover the following:
  - Parameter name
  - Type, for example, string or integer
  - Variable direction, for example, input or output

Additional information that describes the parameter.

Important:

- TaskBot: Include only input parameters required for setting up the TaskBot. Do not list internal variables not required for setup.
- MetaBot: It is important to have parameter tables for input and output variables for MetaBots.

## Other considerations for bot design and development

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

### Hard delays

Avoid using hard delays. The trouble with delays is that they are heavily dependent on the specific computer and its virtual desktop infrastructure (VDI) that the bot runs on. It is better to use commands. For example, use the Wait For Window command if the delay is meant to wait for a window to appear. This removes any dependency on the speed of the VDI.

### Mouse clicks and movement

Avoid mouse movements, scrolling, and clicks in bot development and design. Bots are highly dependent on the display and VDI on which they run. Errors can occur if the screen size is different from the one on which the bot was created.

### Only clean and usable code included in the bot

Do not overcomplicate the bot with unusable code for future development. Remove unusable code and tasks for ease of use by customers.

### Pause task

Avoid pause commands because fully automated and operational bots run autonomously without human interaction, for example, clicking a button to continue.

### Prompts, pauses, and message box commands

Avoid things that require bots to wait for user input. Prompts, pauses, and message box commands stop the bots and MetaBots from running when waiting for user input. Unless user input is required, and a user will definitely be present to provide the input, design the bots without using prompt statements.

### Proper folder structure

Keep related files together. This assists others in understanding which files are related to which bots. This is particularly important with MetaBots.

### Robustness and flexibility should be achieved

Expect the unexpected. Files change. Web pages change. Try not hardcoding solutions if flexible programming methods accommodate change.

### Screen resolution, default is recommended

Use the default resolution when developing bots. Using nondefault screen resolutions forces users to change their screen resolution to run their TaskBots. No specific default resolution is required, if the resolution of the Bot Creator and the Bot Runner match.

### Use of command according to preferences

There is more than one way to do things. Use the most efficient way of doing things and follow the hierarchy of preferred methods.

### Wild cards should be used with applications

Do not develop bots to work with specific editions of the target application. Instead, use wild cards so that it is applicable to all editions of the application, for example, when using Object Cloning, to identify a window object:

- Use wildcards, for example:

```
Salesforce -* Edition - Internet Explorer
```

- Do not use specific versions or editions, for example:

```
Salesforce - Professional Edition - Internet Explorer
```

### Related concepts

[Build advanced bots with the Enterprise client](#)

### Related tasks

[Create a basic MetaBot](#)

## Checklist for Bot Store submissions

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

Note: This checklist is subject to change without notice. Always review this checklist before submitting bots or Digital Workers to the Bot Store.

Item number:	Item:	Bot submission requirement:
1	Bot naming convention	All bots and Digital Workers must follow this naming convention: <ul style="list-style-type: none"> <li>• BotName-VendorName</li> </ul>
2	Readme naming convention	A Readme must be included. The Readme filename must be in this format: <ul style="list-style-type: none"> <li>• BotName-VendorName-Readme.PDF</li> </ul>
3	Readme file format	Readme files must be submitted only in PDF format.
4	Readme packaging	The Readme.pdf file must be included in the zip file.
5	Zip file: Folder structure	Submit bots or Digital Workers as a single zip file. The file must have the following folder structure:

Item number:	Item:	Bot submission requirement:
		<ul style="list-style-type: none"> <li>• My Tasks</li> <li>• My MetaBots</li> <li>• Error Folder</li> <li>• Input Folder</li> </ul> <p>Note: The Readme.pdf must be included in the root folder of the zip file.</p>
6	Files under each folder	<p>The following file types must be submitted under each of the folders:</p> <ul style="list-style-type: none"> <li>• .atmx files under My Tasks</li> <li>• .mbot files under My MetaBots</li> </ul>
7	Logo	<p>Vendor logos must be submitted in one of the following formats:</p> <ul style="list-style-type: none"> <li>• Scalable Vector Graphics (SVG)</li> <li>• Portable Network Graphics (PNG)</li> </ul>
8	Logo image	<p>Vendor logos must work in any resolution without pixilation.</p>
9	<p>Quick links Note: Only YouTube links are accepted.</p>	<p>Vendors must submit links for each of the following:</p> <ul style="list-style-type: none"> <li>• A link to a video about the vendor's company</li> <li>• A link to a video about the bot's functionality</li> <li>• Any other helpful links about the submitted bot</li> </ul> <p>Note: Videos must be 5 minutes or shorter.</p>
10	Screenshots	<p>Three screenshots of the bot or Digital Worker are required with the submission. Note: All three screenshots must show the bot or Digital Worker in use.</p>
11	Prerequisites	<p>All bot or Digital Worker software dependencies and prerequisites must be listed. This includes any application or database dependencies. All prerequisites, including specific version numbers, must be included in the list.</p>

## Why Build on Automation Anywhere?

Automation Anywhere is the industry leader in Robotic Process Automation (RPA) as recognized by multiple analyst firms. We see a future where digital workers engage side-by-side with every employee in every business, making them more productive.

We provide developers with the opportunity to:

- Build on the world's most widely deployed platform for automation and AI.
- Participate in one of the fastest growing enterprise software segments ever.
- Monetize their work the industry's largest Bot Store.

The world's most widely deployed RPA platform.

Automation Anywhere has 1,600+ customers who have deployed 1,000,000+ bots in 90+ countries. Our Digital Workforce platform is the only one that brings together all three components for AI-augmented automation: [RPA](#), [IQ Bot](#) (artificial intelligence), and [Bot Insight](#) (embedded analytics).

One of the fastest growing enterprise software sectors in history.

The global RPA market is emerging as a \$100 billion opportunity according to KeyBanc Capital Markets. Gartner [predicts](#) that by 2020, 40 percent of large enterprises will have deployed RPA software, up from less than 10 percent today.

The industry's largest Bot Store.

Automation Anywhere offers the world's leading marketplace for pre-built, plug and play automation with 400+ bots and Digital Workers, growing every week. Developers of all types can contribute and download bots from the marketplace. Starting this summer, developers will also be able to monetize the bots and [Digital Workers](#) that they create.

We're committed to the success of developers everywhere in building on our platform. To do this, we offer a comprehensive portfolio of tools, resources, events and initiatives for developers. These include:

- Community Edition: [Community Edition](#) provides free access to the full suite of Automation Anywhere solutions, including [RPA](#), [IQ Bot](#) (cognitive automation), and [Bot Insight](#) (embedded analytics) as well as access to the [Bot Store](#) online marketplace.
- Bot Games: [Bot Games](#) is a meeting ground for bot enthusiasts - developers, project managers and business process aficionados from around the world. Attendees can put their bot-building skills to the test and compete in virtual and in-person events taking place around the world in more than 10 countries.
- Developer Training: To get trained on our platform, we provide these options through [Automation Anywhere University](#):
  - Fast-Track Accreditation: An accelerated education and accreditation program for existing RPA developers to learn Automation Anywhere essential commands, features, and functions
  - Bot Developer Learning Trail and Certification: A comprehensive training and certification program, teaching developers how to understand business requirements, identify RPA opportunities, and developer and deploy automations using Automation Anywhere commands.
- Developer Community: Developers worldwide can participate in [A-People](#), Automation Anywhere's community portal, where they can join a forum, access information, get support, and share ideas and expertise.

- 
- Developer Documentation: The Automation Anywhere product documentation [portal](#) provides comprehensive information on how to install and use the company's RPA solutions

Related concepts

[Build a basic bot using the Enterprise client](#)

[Edit a basic bot using the Enterprise client](#)

[Build advanced bots with the Enterprise client](#)

[Recommended standards for bot design, creation, and submission](#)

Related tasks

[Posting to the Bot Store](#)

## Automation Anywhere Digital Worker overview

A Digital Worker contains a set of professional skills that enable it to act, process, and analyze in the same ways as a human.

Digital Workers automate entire processes, do multiple tasks in a set of sequences, and are ready-to-deploy and download from the Automation Anywhere [Bot Store](#).

For example, one of the skills of a Digital Accounts Payable Clerk is invoice processing. The invoice processing skill includes tasks that involve the following:

- Acting: Extract the invoice from email.
- Thinking: Identify the correct data items to extract from the invoice via artificial intelligence.
- Analyzing: Monitor straight-through processing (STP) to identify and highlight opportunities to accelerate the transaction process.

With Digital Workers, human workers and organizations benefit as follows:

- Human workers can refocus their efforts on more interesting, value-added activities (instead of repetitive ones), and deliver greater value to their organization.
- Organizations can rapidly scale their automation activities to increase productivity, efficiency, and growth.

- [High-level architecture of a Digital Worker](#)

A Digital Worker consists of TaskBots and MetaBots (with or without DLLs) that together form one or more skills. It can include calls to REST APIs for external services (for example, an AI engine), where the REST API calls are executed either via native client commands or through a MetaBot with a dynamic link library (DLL).

- [Building Digital Workers for the Bot Store](#)

The Bot Store offers companies an easy way to hire and customize a Digital Worker, and offers developers who build Digital Workers a monetization opportunity.

- [Posting to the Bot Store](#)

The process for submitting a bot and Digital Worker to the Bot Store is the same.

Related concepts

[High-level architecture of a Digital Worker](#)

[Building Digital Workers for the Bot Store](#)

[Bot Store submission guidelines](#)

Related tasks

[Posting to the Bot Store](#)

## High-level architecture of a Digital Worker

A Digital Worker consists of TaskBots and MetaBots (with or without DLLs) that together form one or more skills. It can include calls to REST APIs for external services (for example, an AI engine), where the REST API calls are executed either via native client commands or through a MetaBot with a dynamic link library (DLL).

The Digital Worker enables the customer to automate their workflow. TaskBots and MetaBots included in the Digital Worker implement the skills. Each skill must have a top-level TaskBot, called the Master Bot. The Master Bot invokes other TaskBots and MetaBots. Users must be able to run individual TaskBots and MetaBots by themselves, or from the Master Bot file.

In the same way as when hiring an employee, customers must set up the Digital Worker to fit in their environment. Customers downloading Digital Workers from the Bot Store expect to be able to easily configure and install the Digital Worker – and its TaskBots and MetaBots into the workflows.

For best practices on configuration, see [Building Digital Workers for the Bot Store](#).

## Building Digital Workers for the Bot Store

The Bot Store offers companies an easy way to hire and customize a Digital Worker, and offers developers who build Digital Workers a monetization opportunity.

The following topics provide important information for building a Digital Worker for wide adoption.

- [Plan a Digital Worker](#)

Use the following list to help you plan the features and functions of your Digital Worker.

- [Using the boilerplate template](#)

Use this template to build according to Bot Store standards with all folder structures defined.

- [Building with modular logic](#)

Digital Workers are developed in a modular style to enable customers to select the components of the Digital Worker to include in their business process automation.

- [Error handling](#)

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

- [Naming conventions](#)

The name you choose to give your Digital Worker must clearly indicate the business function it does.

- [ReadMe files](#)

Submit Digital Workers with ReadMe.txt or .pdf files, which inform end users on how to install and use the Digital Worker.

- [Assets](#)

Include all files - Master Bot, TaskBots, and MetaBots required to run your Digital Worker.

- [Digital Worker packaging](#)

Digital Workers submitted to the Bot Store must include all the components in a zip file.

Related concepts

[Bot Store submission guidelines](#)

Related tasks

[Posting to the Bot Store](#)

[Create a basic MetaBot](#)

## Plan a Digital Worker

Use the following list to help you plan the features and functions of your Digital Worker.

To plan a Digital Worker, consider the work that a person in the job role regularly does that includes repeatable and automatable activities.

What skills and experience must the human worker have to do the work? The use cases you define here are opportunities for Digital Workers.

Prepare a high-level summary of what this Digital Worker will do, and the automatable use cases for that work.

- List the various steps, events, and tasks that this Digital Worker will do and use screenshots or a flow diagram.
- Identify the trigger events and decisions being made to complete the work, what can be automated, and what can be learned with artificial intelligence (AI).
- What are the possible variations to the typical use cases? Identify any variation that can be automated or the limits to what the Digital Worker can do with the use cases.
- Identify the systems being used and accessed in the use cases.

After thoroughly considering the specifics of the work to be done, list the skills and job role typically associated with the work and the Digital Worker, for example, a Human Resources Onboarding Specialist with the following skills:

- Inputs profile information into the Human Resources System
- Distributes Welcome Packets and Benefits Information
- Manages the collection of New Hire Legal Documents

Consider the benefits of the Digital Worker. Evaluate the work being done for the job role by the Digital Worker and how it relates to the human counterpart and the overall business. Use quantitative and qualitative data to help define the benefits. Examples of questions to ask are as follows:

- Is it offloading a reasonable percentage of repeatable and possibly mundane work from the human worker?
- How much time, effort, and resources will be saved with the Digital Worker?
- Will the employee's morale be improved if repeatable work is offloaded to a Digital Worker?

In [Using the boilerplate template](#), you learn how to use the template to build according to Bot Store standards with all folder structures defined.

## Using the boilerplate template

Use this template to build according to Bot Store standards with all folder structures defined.

Automation Anywhere provides a [Boilerplate Code Template](#), which is available for download from the Bot Store. Use this template to build both individual bots and Digital Workers (which include multiple TaskBots and MetaBots).

Review the README included in the Boilerplate Code Template first, before using as the basis for the Digital Worker.

Use this template as follows:

## Procedure

1. Download [Create Boilerplate code as Per Bot Store Standards](#) from the Bot Store.
2. Unzip the package and load it under the Automation Anywhere/My Tasks/Bot Store directory on the local machine.

The following folder and file structure are visible:

- Error Folder
- Input Files
- My MetaBots
- My Tasks
- README-Boilerplate code for bot store.pdf

3. Navigate to AAFOLDER/My Tasks/BoilerPlate\_BotStore.atmx.
4. Before running the bot, provide values for the bot\_name and owner\_name variables.
5. Run the bot to get the required folders that comply with Bot Store standards.  
After the task finishes successfully, the bot <Bot Name-Owner Name> is created under AAFOLDER/My Tasks/Bot Store/ and the newly created folder contains MasterBot.atmx under the My Tasks folder.  
This folder already has code for error handling.
6. Replace <Bot Name-Owner Name> with these values.

## Next steps

The Bot Store framework is ready and coding can begin.

In [Building with modular logic](#), you learn how to develop a Digital Worker in a way that encourages reusability.

## Building with modular logic

Digital Workers are developed in a modular style to enable customers to select the components of the Digital Worker to include in their business process automation.

Monolithic code is difficult to follow, edit, and update. Divide tasks into separate TaskBots or MetaBots (instead of having everything in a single TaskBot or MetaBot).

As with any object-oriented approach to programming, create a separate bot for each specific function. Doing this not only makes your code easier to update and understand, but also encourages reusability because customers can more easily pick and choose components to include in their business process automation.

For example, if you want to build a Digital Worker that

- creates an offer letter,
- generates an electronic envelope,
- sends an email with the offer letter in the electronic envelope,
- and monitors status.

Divide each into separate Tasks (.atmx files). To run these Tasks in the proper order, write a Master Bot which calls on the tasks sequentially.

In [Error handling](#), you learn about including an error handling mechanism to minimize disruption and help endusers with debugging.

## Error handling

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

When added to a task, the Error Handling allows us to gracefully handle any errors that occur.

Handle errors as follows:

- Take Snapshot: It saves a snapshot of the screen at the moment of the error. A screenshot is sometimes the best way to determine the cause of an error when running on an unattended Bot Runner.
- Run Task: Starts a new Task when an error occurs. This Task can do functions, for example, cleaning up temporary files.
- Log Data into File: Writes a new log entry into the specified log file. This log entry can also contain a time stamp, which is useful for determining exactly when the error occurred. Using the system variables for \$Error Line Number\$ and \$Error Description\$ provides useful data for the log.
- Send Email: Sends an emailed error report which can contain a screenshot of the error (see Take Snapshot) and variable values to help troubleshoot the issue.
- Variable Assignment: Sets a value to a specific variable. This is useful for tracking whether an error occurred in the task, then doing other events, for example, logging task successes and failures.
- Set Task Status: Reports a Fail or Pass condition to the Enterprise Control Room on an error. The Pass condition is useful when an error condition is expected but you want to ignore it and continue.

## Bot Store requirements for error handling

Every bot submitted to the Bot Store must have an error handling mechanism and an error folder structure as follows:

- Create an error folder in the following location:

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder
```

- Under the ErrorFolder, create two subfolders:

- Logs

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Logs
```

- Snapshots

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Snapshots
```

---

All bot code must handle errors as follows:

- Capture error windows.  
Save error window snapshots to the Snapshots folder.
- Log error messages, including a time stamp, to the Logs folder.

Important: .Bot submissions that do not follow error handling requirements are rejected.

In [Naming conventions](#), you learn about naming your Digital Worker and the accompanying files.

Related reference

[Error Handling command](#)

## Naming conventions

The name you choose to give your Digital Worker must clearly indicate the business function it does.

The name must start with 'Digital', and be short and precise (three to four words), for example, Digital Employee Onboarding Specialist.

TaskBots must have descriptive names of the functions that they run. When submitting to the Bot Store, each TaskBot must have a prefix of 01, 02, 03, respectively with the Master Bot prefixed as 00, for example:

- 00-Master Bot.atmx
- 01-Create Offer Letter.atmx
- 02-Generate Electronic Envelope.atmx
- 03-Send Email.atmx
- 04-Monitor status.atmx

Every individual TaskBot must have a corresponding MetaBot file, if MetaBot logic is used. Define names for MetaBot that clearly describe the function that they provide, for example:

- Envelope Creation.mbot
- Envelope Status.mbot

In [ReadMe files](#), you learn about the documentation that must accompany your Digital Worker.

## ReadMe files

Submit Digital Workers with ReadMe.txt or .pdf files, which inform end users on how to install and use the Digital Worker.

Every individual TaskBot (.atmx file) must have its own ReadMe. Create a master ReadMe on the overall functions of all the bots. Name the master ReadMe <Digital Worker Name> MasterReadMe.pdf

The contents of each ReadMe file must include the following:

- Overview: Description of the Digital Worker or individual TaskBot
- Prerequisites

- Installation steps
- For the master ReadMe describing the Digital Worker, include the following:
  - Skill Mapping table: A table describing each Skill, the TaskBot files, and MetaBot files associated with each Skill, and links to the individual ReadMe's for each TaskBot
  - A Visual Workflow that illustrates the steps that the Digital Worker takes in running each Skill (not between Skills)
  - A description of how to use the Digital Worker in practice
  - Any other information required to configure the Digital Worker, for example, Credential Vault Parameters
- For ReadMe's of individual TaskBots, include the following:
  - Parameter table: A table that lists each Parameter that must be configured by the user for the bot. The table must cover Parameter Name, Type, for example, String, Direction, specifically, Input or Output Variable, and Additional Information that describes the Parameter
  - The following are sample parameters:

Parameter Name	Type	Direction	Additional Info
\$vUserName\$	String	Input	Username for Application
\$vExcelPath\$	String	Output	Input Excel file path
\$vURL\$	String	Input	URL for Application
\$vPassword\$	String	Input	Password for Login into Application
\$vFileName\$	String	Input	Filename to be uploaded

Note: You must have Parameter tables for inputs and outputs for MetaBots.

As a general principle: include everything in the ReadMe that you would want to see if you had no previous knowledge of the Digital Worker and needed to get it up and running.

In [Assets](#), covers the files to include when submitting your Digital Worker.

## Assets

Include all files - Master Bot, TaskBots, and MetaBots required to run your Digital Worker.

The following is a sample list:

File	Description
MasterBot.atmx	bot that calls TaskBots
Login.atmx	TaskBot to login
Logout.atmx	TaskBot to logout
Processingapp.atmx	TaskBot that handles processing logic
MainLogic.mbot	MetaBot for reusable automation
GUIScript.dll	Shared library

File	Description
Configuration.xls	Config file
Input File.xlsx	Sample Input File
Output File.xlsx	Sample Output File
README.txt	Include a README file that provides information on each bot's features, installation instructions, input/output parameter details, reusable components, and any special instructions.

If developing a MetaBot, include Assets and Logic.

MetaBot (.mbot)	Description
MetaBot	Must include Assets and Logic
Assets	Screens and DLLs
Navigation Flow	Logic that can be integrated into automation tasks when required
Variables	Ensure you have variable operations and avoid hard coding

In [Digital Worker packaging](#), covers what to include when submitting your Digital Worker.

## Digital Worker packaging

Digital Workers submitted to the Bot Store must include all the components in a zip file.

Name the zip file after the Digital Worker, for example: "Digital Employee Onboarding Specialist". The contents of the zip file must include the following:

- Error Folder
- Input Folder
- My MetaBots
- My Tasks
- Output Files
- Individual Readme's for each TaskBot
- Readme for the overall functions of the Digital Worker

Include a short video that demonstrates the use of the Digital Worker.

See [Checklist for Bot Store submissions](#) for information about submitting a Digital Worker to the Bot Store.

## Posting to the Bot Store

The process for submitting a bot and Digital Worker to the Bot Store is the same.

Follow these steps to submit a bot or Digital Worker:

## Procedure

1. On the home page of the Bot Store, click your profile in the upper right corner.
2. Click My Submissions.
3. On the next screen, click Add New bot.
4. Complete the fields.

- **Checklist for Bot Store submissions**

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

### Related concepts

[Building Digital Workers for the Bot Store](#)

[Why Build on Automation Anywhere?](#)

[Recommended standards for bot design, creation, and submission](#)

### Checklist for Bot Store submissions

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

Note: This checklist is subject to change without notice. Always review this checklist before submitting bots or Digital Workers to the Bot Store.

Item number:	Item:	Bot submission requirement:
1	Bot naming convention	<p>All bots and Digital Workers must follow this naming convention:</p> <ul style="list-style-type: none"> <li>• BotName-VendorName</li> </ul>
2	Readme naming convention	<p>A Readme must be included. The Readme filename must be in this format:</p> <ul style="list-style-type: none"> <li>• BotName-VendorName-Readme.PDF</li> </ul>
3	Readme file format	Readme files must be submitted only in PDF format.
4	Readme packaging	The Readme.pdf file must be included in the zip file.
5	Zip file: Folder structure	<p>Submit bots or Digital Workers as a single zip file. The file must have the following folder structure:</p> <ul style="list-style-type: none"> <li>• My Tasks</li> <li>• My MetaBots</li> <li>• Error Folder</li> <li>• Input Folder</li> </ul> <p>Note: The Readme.pdf must be included in the root folder of the zip file.</p>

Item number:	Item:	Bot submission requirement:
6	Files under each folder	<p>The following file types must be submitted under each of the folders:</p> <ul style="list-style-type: none"> <li>• .atmx files under My Tasks</li> <li>• .mbot files under My MetaBots</li> </ul>
7	Logo	<p>Vendor logos must be submitted in one of the following formats:</p> <ul style="list-style-type: none"> <li>• Scalable Vector Graphics (SVG)</li> <li>• Portable Network Graphics (PNG)</li> </ul>
8	Logo image	<p>Vendor logos must work in any resolution without pixilation.</p>
9	<p>Quick links Note: Only YouTube links are accepted.</p>	<p>Vendors must submit links for each of the following:</p> <ul style="list-style-type: none"> <li>• A link to a video about the vendor's company</li> <li>• A link to a video about the bot's functionality</li> <li>• Any other helpful links about the submitted bot</li> </ul> <p>Note: Videos must be 5 minutes or shorter.</p>
10	Screenshots	<p>Three screenshots of the bot or Digital Worker are required with the submission. Note: All three screenshots must show the bot or Digital Worker in use.</p>
11	Prerequisites	<p>All bot or Digital Worker software dependencies and prerequisites must be listed. This includes any application or database dependencies. All prerequisites, including specific version numbers, must be included in the list.</p>

## Recommended standards for bot design, creation, and submission

This content provides guidance for bot developers throughout the entire process of bot development from designing and creating bots through posting them to the Bot Store.

Read the following sections to gain a better understanding of each of the topics.

- [Start with Sample bot from Bot Store](#)

In order to assist bot and Digital Worker developers in creating high quality software, the bot package submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

- [Enable bots to run on other computers](#)

Bot developers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

- [Modular Bots are a must](#)

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

- [Use variables liberally](#)

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

- [Variable names](#)

Automation Anywhere has a recommended variable naming convention.

- [Passing parameters from TaskBots to MetaBots](#)

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

- [Use Credential Vault to store user IDs, passwords, and other sensitive data](#)

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

- [Follow secure coding practices](#)

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

- [Error handling](#)

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

- [Bot configuration](#)

It is important to make the configuration of the bot straightforward for end users who are installing it.

- [Code comments](#)

Remember to liberally comment bot code.

- [Create a Readme file](#)

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

- [Other considerations for bot design and development](#)

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

- [Checklist for Bot Store submissions](#)

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

## Related concepts

[Build a basic bot using the Enterprise client](#)

[Build advanced bots with the Enterprise client](#)

[Why Build on Automation Anywhere?](#)

[Recommended standards for bot design, creation, and submission](#)

## Start with Sample bot from Bot Store

In order to assist bot and Digital Worker developers in creating high quality software, the bot package submission structure is available in Github open source. Start with Automation Anywhere sample bot in Github [Connect your account to preview links](#).

Use the checklist for Bot Store submissions [Checklist for Bot Store submissions](#) and follow the Bot Store submission requirements. All requirements in this checklist must be met for a bot or a Digital Digital Worker Bot Store package submissions.

The checklist also provides the Readme Template example, as well as, Best Practice examples for a individual bot or a Digital Worker.

## Enable bots to run on other computers

Bot developers must consider how a bot works with a Bot Runner to allow bots to run on computers other than the computer on which a bot is created.

During the development of new bots, developers often point to local copies of files and attachments. This works great if the bot is only run on the developers' local computers. A local path looks something like this:

```
C:\Users\UserName\Documents...
```

Bot Runners are unattended computers (physical or virtual computers) whose job is to run the tasks presented to them. Because these Bot Runners have their own account login credentials, localized paths do not work.

The system variable \$AAApplicationPath\$ resolves this problem.

Local path during development:

```
C:\Users\UserName\Documents\Automation Anywhere Files\Automation Anywhere\My Docs\accounts.xlsx
```

Relative path that works in Bot Runner:

```
$AAApplicationPath$\Automation Anywhere\My Docs\accounts.xlsx
```

Not only does this make the path shorter, but it also makes the bot portable. When preparing a TaskBot to work with Bot Runner or a co-worker's computer, use the \$AAApplicationPath\$ anywhere that points to a local file.

Tip: Create variables, for example, "vPath," then use the Variable Operation with \$AAApplicationPath\$ to make the paths short and manageable.

## Modular Bots are a must

Monolithic code is difficult to follow, edit, and update. Instead of having everything in single bot, separate tasks into different TaskBots or MetaBots.

As with any object-oriented approach to programming, creating separate bots for each distinct function makes the code easier to understand, update, and reuse. Customers can more easily pick and choose the best components to include in their business process automation.

For example, these are typical steps to automate in a process:

1. Log in.
2. Create Lead.
3. Log out.

Each of these steps should be divided into unique TaskBots (.atmx files). Create a Master Bot to use for each of the three tasks in the correct order.

Consider creating and using MetaBots for common processes and tasks. MetaBots encapsulate assets and logic used in common processes and tasks, making those processes and tasks reusable by other bots. Over time a library of functions and tasks can be contained in MetaBots which are reusable by TaskBots. This avoids the need to create redundant functionality in multiple bots.

MetaBots are used to encapsulate logic inside a DLL, allowing bot developers to hide complex tasks and processes from users. Following are the high-level steps for adding a DLL to a MetaBot:

1. Create a DLL that does the respective function.
2. Add the DLL as an asset in the MetaBot Designer.
3. Add Logic to do the operation.
4. Use the MetaBot in other bots to do the task.

Related concepts

[Build a simple MetaBot with one DLL](#)

[Advanced MetaBot with two DLLs](#)

## Use variables liberally

Use variables throughout the bot code. Avoid hardwiring values into bots. Hardwiring values makes the code less configurable for customers' environments.

Create new variables for an automation from the Variable Manager. The Variable Manager shows the local variables that are defined for each specific task. To create a new user variable, follow these steps:

### Procedure

1. Go to Workbench > Variable Manager.
2. In the Variable Manager, click Add at the bottom or right-click an existing variable and select Add.

In the Add Variable window, the Create New Variable option is selected by default.

3. Select a Variable Type.

---

Enter a name and select the method for determining the value of the variable.

## Next steps

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Variable names

Automation Anywhere has a recommended variable naming convention.

- Variables start with "v", such as vPath.
- Lists start with "lst", such as lstMyList.
- Arrays start with "arr", such as arrPirateBooty.
- Randoms start with "rdm", such as rdmChoice.

Some developers prefer to add variable "type" prefixes to the front of their variables, for example:

- "int" for variables expected to hold whole numbers (integers)
- "str" for variables expected to hold a string of characters

Regardless of the naming scheme, variables in Automation Anywhere do not have a strong type.

This means, a variable that contains a number, then does a mathematical calculation, can later contain a string value. This is called loose typing. Although it adds flexibility when working with variables, it means creators must remember which variables are used for which purposes, and not confuse them.

## Passing parameters from TaskBots to MetaBots

An automation that uses different TaskBots needs the ability to pass parameters back and forth among the different bots included in the automation.

Create variables with different parameter types to enable bot to bot input and output.

Parameter types:

- None
- Input
- Output
- InputOutput

Based on its parameter type, variables are used as an input parameter, output parameter, or both in TaskBot and MetaBot Logic.

- 
- Input parameters add values to the variable or assign another variable as its value.
  - Output parameters assign variables as its value for output to other bots or end users.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

## Use Credential Vault to store user IDs, passwords, and other sensitive data

Store all user IDs and passwords in the Credential Vault in the Enterprise Control Room, which is then referenced in the bot code.

### Prerequisites

Important: Never hardwire user IDs and passwords as variables in tasks because this introduces a security risk.

### Procedure

1. Log in to the Enterprise Control Room as a Bot Creator.
2. From the left menu, go to ADMINISTRATION > Roles.
3. In the top right corner, click Create role.
4. Enter text in the following fields:
  - Role name
  - Role description (optional)
5. Scroll down to Manage my credentials and lockers and select View and edit ALL credentials attributes value.
6. Click Create role.
7. In the left menu, go to BOTS > Credentials, and select Credentials.
8. Click Create credential.  
Give the credential a name and add attributes for example, username, password, or others, to make it available for use in other TaskBots and MetaBots.
9. Click Create credential.
10. Go to BOTS > Credentials, and click Create locker.  
All available credentials appear under Available Credentials.
11. In the Locker name field, type a name for the locker.
12. Select the credentials that were just created, and add them to the Selected column.
13. Click the CONSUMERS tab.
14. Select roles from the Available roles column and add them to the Selected column.
15. Click Create locker.

### Next steps

Now the Credential is available to use as an input for values in TaskBots and MetaBots.

Following are some important facts about using variables:

- Developer-created variables can be used with most Automation Anywhere commands.
- All command fields with the light bulb icon support variables.
- Press the F2 function key to list all user and system variables that are available for a selection.
- When a TaskBot runs, Automation Anywhere replaces the variable name with the actual value of the variable.

**Important:** Credential variables are not visible until a Enterprise Control Room user with Locker Admin privileges enables the setting in the Enterprise Control Room. When the setting is enabled, credential variables are available for passing as parameters from one TaskBot/MetaBot Logic to another TaskBot/MetaBot Logic. Read [Passing parameters from and to MetaBot Logic](#) for details.

For more information on how to use the Credential Vault, see [Credentials - Overview](#) and [Credential variables](#).

**Note:** If a TaskBot or MetaBot is run directly from the Enterprise Control Room, the credentials used from the Credential Vault might need to be manually reassigned. For example, if a MetaBot is run from the Enterprise Control Room, open the MetaBot and reassign any input parameters that are stored in the Credential Vault.

Related concepts

[Credentials - Overview](#)

Related information

[Credential variables](#)

## Follow secure coding practices

Bot developers should ensure their code follows standard secure coding practices, including Bot Logic and C# code written for DLLs.

The following list of security checks are generally applicable and relevant for bot creation.

These checks correspond to specific software vulnerabilities identified by the [Open Web Application Security Project \(OWASP\)](#), a not-for-profit organization focused on improving the security of software. Each of the following OWASP issues correspond to specific items included in the [Common Weakness Enumeration \(CWE\)](#), a list of software security vulnerabilities which can occur in software development as provided by MITRE, a nonprofit research and development group.

Developers must consider additional secure coding practices in accordance with the internal security policies of their environments.

OWASP issue	Description	Corresponding CWEs
<a href="#">A1: Injection</a>	Almost any source of data can be an injection vector, environment variables, parameters, external and internal web services, and all types of users. <a href="#">Injection flaws</a> occur when an attacker can send hostile data to an interpreter.	<ul style="list-style-type: none"> <li>• CWE-78: Improper Neutralization of Special Elements Used in an OS Command (OS Command Injection)</li> <li>• CWE-89: SQL Injection</li> <li>• CWE-94: Code Injection</li> <li>• CWE-434: Unrestricted Upload of File with Dangerous Type</li> </ul>

OWASP issue	Description	Corresponding CWEs
		<ul style="list-style-type: none"> <li>CWE-494: Download of Code Without Integrity Check</li> <li>CWE-829: Inclusion of Functionality from Untrusted Control Sphere</li> </ul>
A2: Broken Authentication	Attackers have access to hundreds of millions of valid username and password combinations for credential stuffing, default administrative account lists, automated brute force, and dictionary attack tools. Session management attacks are well understood, particularly in relation to unexpired session tokens.	<ul style="list-style-type: none"> <li>CWE-306: Missing Authentication for Critical Function</li> <li>CWE-307: Improper Restriction of Excessive Authentication Attempts</li> <li>CWE-798: Use of Hard-coded Credentials</li> <li>CWE-807: Reliance on Untrusted Inputs in a Security Decision</li> <li>CWE-862: Missing Authorization</li> <li>CWE-863: Incorrect Authorization</li> </ul>
A3: Sensitive Data Exposure	Rather than directly attacking crypto, attackers steal keys, execute man-in-the-middle attacks, or steal clear text data off the server, when in transit, or from the user's client, such as a browser. A manual attack is generally required. Previously retrieved password databases could be brute forced by Graphics Processing Units (GPUs).	<ul style="list-style-type: none"> <li>CWE-311: Missing Encryption of Sensitive Data</li> <li>CWE-319: Clear text Transmission of Sensitive Information</li> </ul>
A5: Broken Access Control	Exploitation of access control is a core skill of attackers. <a href="#">SAST</a> and <a href="#">DAST</a> tools can detect the absence of access control but cannot verify if it is functional when it is present. Access control is detectable using manual means, or possibly through automation for the absence of access controls in certain frameworks.	<ul style="list-style-type: none"> <li>CWE-73: External Control of File Name or Path</li> <li>CWE-285: Improper Authorization</li> </ul>
A6: Security Misconfiguration	Attackers often attempt to exploit unpatched flaws or access default accounts, unused pages, unprotected files and directories, and so on, to gain unauthorized access or knowledge of the system.	<ul style="list-style-type: none"> <li>CWE-250: Execution with Unnecessary Privileges</li> <li>CWE-676: Use of Potentially Dangerous Function</li> <li>CWE-732: Incorrect Permission Assignment for Critical Resource</li> </ul>

OWASP issue	Description	Corresponding CWEs
A9: Using Components with Known Vulnerabilities	Although it is easy to find already-written exploits for many known vulnerabilities, other vulnerabilities require a concentrated effort to develop a custom exploit.	<ul style="list-style-type: none"> <li>CWE-190: Integer Overflow or Wraparound</li> <li>CWE-327: Use of a Broken or Risky Cryptographic Algorithm</li> <li>CWE-759: Use of a One-way Hash Without a Salt</li> </ul>

## Error handling

Because bots are typically used on an unattended computer, no one is available to click OK to continue processing when an error occurs. Use the Begin/End Error Handling statements to gracefully handle error dialogs.

When added to a task, the Error Handling allows us to gracefully handle any errors that occur.

Handle errors as follows:

- Take Snapshot: It saves a snapshot of the screen at the moment of the error. A screenshot is sometimes the best way to determine the cause of an error when running on an unattended Bot Runner.
- Run Task: Starts a new Task when an error occurs. This Task can do functions, for example, cleaning up temporary files.
- Log Data into File: Writes a new log entry into the specified log file. This log entry can also contain a time stamp, which is useful for determining exactly when the error occurred. Using the system variables for \$Error Line Number\$ and \$Error Description\$ provides useful data for the log.
- Send Email: Sends an emailed error report which can contain a screenshot of the error (see Take Snapshot) and variable values to help troubleshoot the issue.
- Variable Assignment: Sets a value to a specific variable. This is useful for tracking whether an error occurred in the task, then doing other events, for example, logging task successes and failures.
- Set Task Status: Reports a Fail or Pass condition to the Enterprise Control Room on an error. The Pass condition is useful when an error condition is expected but you want to ignore it and continue.

## Bot Store requirements for error handling

Every bot submitted to the Bot Store must have an error handling mechanism and an error folder structure as follows:

- Create an error folder in the following location:

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder
```

- Under the ErrorFolder, create two subfolders:
  - Logs

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Logs
```

- Snapshots

```
<AAFOLDER>\MyTasks\Bot Store\<DigitalWorkerName>\ErrorFolder\Snapshots
```

All bot code must handle errors as follows:

- Capture error windows.  
Save error window snapshots to the Snapshots folder.
- Log error messages, including a time stamp, to the Logs folder.

Important: .Bot submissions that do not follow error handling requirements are rejected.

In [Naming conventions](#), you learn about naming your Digital Worker and the accompanying files.

Related reference

[Error Handling command](#)

## Bot configuration

It is important to make the configuration of the bot straightforward for end users who are installing it.

Use this recommended approach to create a user-friendlybot configuration:

### User-prompted configuration

- Create a configuration file that a bot calls to initialize variables.
- Create step-by-step end user prompts to capture the required input for any variables.

As a general practice, avoid requiring end users to set variables directly in bots. However, there are instances that require manual configuration by the end user, specifically with MetaBots.

Include guidance to the end user in the Readme file about any manual configuration of variables, or if the bot configuration can be run with just the configuration file. The bot Readme provides details about the Configuration File and any other input files, with the exception of credentials, that are needed for the bot to work.

## Code comments

Remember to liberally comment bot code.

Use the following practices for code commenting:

- Make a block of comments at the beginning of a TaskBot, clearly stating what the bot does.

- Comment complex blocks of code to let developers and users know what was done.

```

1 Comment: ****
2 Comment: It's really a good idea to liberally
3 Comment: comment code.
4 Comment:
5 Comment: Comments help developers remember what
6 Comment: and why something was coded.
7 Comment:
8 Comment: Comments help users understand Bots.
9 Comment:
10 Comment: There is no such thing as too
11 Comment: many code comments.
12 Comment: ****

```

Automation Anywhere bot code comments are highlighted in green.

## Create a Readme file

It is important that each bot submitted to the Bot Store have its own Readme.pdf file. These Readme files allow end users to understand how to install and use the bot.

Each TaskBot (.atmx files) or MetaBot (.mbot files) must have its own Readme file. Each Readme file must include the following:

- Overview: Description of the TaskBot
- Prerequisites:
- Installation steps: Include details about the configuration file and any other input files (except Credentials) that are required for the bot to work.
- Parameter table: Include a table listing parameters that the end user must use to configure the bot. The table must cover the following:
  - Parameter name
  - Type, for example, string or integer
  - Variable direction, for example, input or output

Additional information that describes the parameter.

Important:

- TaskBot: Include only input parameters required for setting up the TaskBot. Do not list internal variables not required for setup.
- MetaBot: It is important to have parameter tables for input and output variables for MetaBots.

## Other considerations for bot design and development

This list of other considerations for bot design and development is in alphabetical order. The list is not in any implicit or specific order of importance.

### Hard delays

Avoid using hard delays. The trouble with delays is that they are heavily dependent on the specific computer and its virtual desktop infrastructure (VDI) that the bot runs on. It is better to use commands. For example, use the Wait For Window command if the delay is meant to wait for a window to appear. This removes any dependency on the speed of the VDI.

### Mouse clicks and movement

Avoid mouse movements, scrolling, and clicks in bot development and design. Bots are highly dependent on the display and VDI on which they run. Errors can occur if the screen size is different from the one on which the bot was created.

### Only clean and usable code included in the bot

Do not overcomplicate the bot with unusable code for future development. Remove unusable code and tasks for ease of use by customers.

### Pause task

Avoid pause commands because fully automated and operational bots run autonomously without human interaction, for example, clicking a button to continue.

### Prompts, pauses, and message box commands

Avoid things that require bots to wait for user input. Prompts, pauses, and message box commands stop the bots and MetaBots from running when waiting for user input. Unless user input is required, and a user will definitely be present to provide the input, design the bots without using prompt statements.

### Proper folder structure

Keep related files together. This assists others in understanding which files are related to which bots. This is particularly important with MetaBots.

### Robustness and flexibility should be achieved

Expect the unexpected. Files change. Web pages change. Try not hardcoding solutions if flexible programming methods accommodate change.

### Screen resolution, default is recommended

Use the default resolution when developing bots. Using nondefault screen resolutions forces users to change their screen resolution to run their TaskBots. No specific default resolution is required, if the resolution of the Bot Creator and the Bot Runner match.

### Use of command according to preferences

There is more than one way to do things. Use the most efficient way of doing things and follow the hierarchy of preferred methods.

### Wild cards should be used with applications

Do not develop bots to work with specific editions of the target application. Instead, use wild cards so that it is applicable to all editions of the application, for example, when using Object Cloning, to identify a window object:

- Use wildcards, for example:

```
Salesforce -* Edition - Internet Explorer
```

- Do not use specific versions or editions, for example:

```
Salesforce - Professional Edition - Internet Explorer
```

## Related concepts

[Build advanced bots with the Enterprise client](#)

## Related tasks

[Create a basic MetaBot](#)

## Checklist for Bot Store submissions

This checklist contains requirements for Bot Store submissions. All requirements in this checklist must be met for a bot or a Digital Worker submission to be accepted.

Note: This checklist is subject to change without notice. Always review this checklist before submitting bots or Digital Workers to the Bot Store.

Item number:	Item:	Bot submission requirement:
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2	Readme naming convention	A Readme must be included. The Readme filename must be in this format: <ul style="list-style-type: none"><li>• BotName-VendorName-Readme.PDF</li></ul>
3	Readme file format	Readme files must be submitted only in PDF format.
4	Readme packaging	The Readme.pdf file must be included in the zip file.
5	Zip file: Folder structure	Submit bots or Digital Workers as a single zip file. The file must have the following folder structure: <ul style="list-style-type: none"><li>• My Tasks</li><li>• My MetaBots</li><li>• Error Folder</li><li>• Input Folder</li></ul> <p>Note: The Readme.pdf must be included in the root folder of the zip file.</p>
6	Files under each folder	The following file types must be submitted under each of the folders: <ul style="list-style-type: none"><li>• .atmx files under My Tasks</li><li>• .mbot files under My MetaBots</li></ul>
7	Logo	Vendor logos must be submitted in one of the following formats:

Item number:	Item:	Bot submission requirement:
		<ul style="list-style-type: none"> <li>• Scalable Vector Graphics (SVG)</li> <li>• Portable Network Graphics (PNG)</li> </ul>
8	Logo image	<p>Vendor logos must work in any resolution without pixelation.</p>
9	<p>Quick links Note: Only YouTube links are accepted.</p>	<p>Vendors must submit links for each of the following:</p> <ul style="list-style-type: none"> <li>• A link to a video about the vendor's company</li> <li>• A link to a video about the bot's functionality</li> <li>• Any other helpful links about the submitted bot</li> </ul> <p>Note: Videos must be 5 minutes or shorter.</p>
10	Screenshots	<p>Three screenshots of the bot or Digital Worker are required with the submission. Note: All three screenshots must show the bot or Digital Worker in use.</p>
11	Prerequisites	<p>All bot or Digital Worker software dependencies and prerequisites must be listed. This includes any application or database dependencies. All prerequisites, including specific version numbers, must be included in the list.</p>

# Security architecture

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

The platform's security architecture is founded on Least Privilege principles and a strict Separation of Duty model with 41 technical controls implemented across seven NIST 800-53r4 Control Families. Controls are applied across three components: the Enterprise Control Room, Bot Creators (development systems), and Bot Runners (bot execution run times) through the bot life cycle from creation through decommissioning. This security architecture and the underlying controls are mapped to industry best practices as defined by NIST and can be readily mapped to other frameworks, for example, COBIT (SOX) and ISO 27002.

## Access Controls. Automation Anywhere Enterprise (AAE)

Access Controls. Automation Anywhere Enterprise (AAE) limits and controls human and bot access to logical resources across components.

- Two independent control planes enforce least privilege. Only developers are enabled to read or write, only authorized Enterprise Control Room users to execute automations, (Enterprise Control Room authorizes and executes) subject to fine-grained Role Based Access Controls (RBAC) down to individual automations (bot), Bot Runners and domains.
- Bot-level Separation of Duty is enforced. Each bot is obfuscated and executed by its corresponding authorized Bot Runners. Tampering at execution is prevented via Stealth Mode and complete user interface disabling.
- 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.
- Bots are controlled via a robust version control system, for rollback and full event logging.
- 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.

- [Automation Anywhere Enterprise Overview](#)

The Automation Anywhere Enterprise's digital workforce platform is the foundation to deliver complex business work-related automation, securely and at scale.

- [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.

- [Data protection and access control](#)

- [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](#)

- [Auditing and Logging](#)

- [Additional security controls](#)

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

- [Securing the RPA environment with external controls](#)

The Automation Anywhere architecture consists of a standard desktop and server class infrastructure for the clients and the Enterprise Control Room.

- [List of cryptographic providers](#)

## Automation Anywhere Enterprise Overview

The Automation Anywhere Enterprise's digital workforce platform is the foundation to deliver complex business work-related automation, securely and at scale.

Automation Anywhere leads the industry with the largest installed base of bots (customizable software that automates repetitive tasks) and is larger than its closest competitor. This large install base and product maturity translates into a robust and resilient product with features unparalleled in the Robotic Process Automation (RPA) space. Automation Anywhere's bots have proven capabilities of automating thousands of applications across varying infrastructures and industries, including some of the world's largest banks and telecommunication companies. This is the reason seventeen of the top twenty Business Process Outsourcers (BPO) have chosen Automation Anywhere to deliver their Enterprise-class Digital Workforce.

Automation Anywhere Enterprise has been designed to gradually scale up to match each step of the RPA journey. It avoids imposing complexities at the early stages, to ensure short time to benefit and to reduce expenses. No heavy workflow methodologies or burdensome infrastructure requirements are present during

the initial phases. Once initial pilots are ready to scale up, the centralized Enterprise Control Room delivers the automated provisioning, orchestration, and controls required for large scale deployments. From desktops to data center and cloud-based scale ups, Automation Anywhere distinguishes itself by delivering Enterprise-class control and management, without diminishing rapid time to value, across any infrastructures.

- **Distributed Architecture**

Automation Anywhere platform is deployed using a distributed architecture.

- **Solution Components**

AAE's distributed architecture consists of a Control Room, a Windows-based server, and Bot Creators and Bot Runners that are Windows-based clients.

- **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.

- **Distributed architecture with HA/DR support**

The Automation Anywhere Enterprise self-contained platform within the customer environment, mitigates the risks of cross-contamination, from an unlikely event of a security breach from another network.

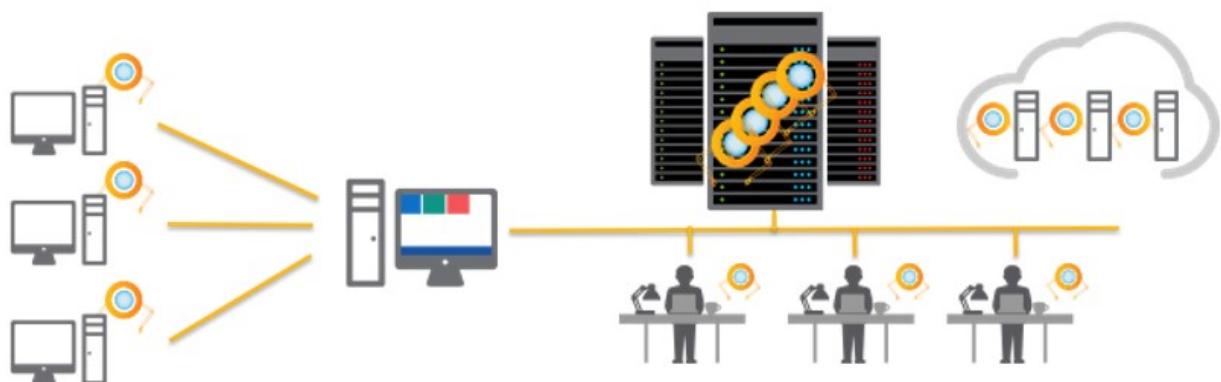
## Distributed Architecture

Automation Anywhere platform is deployed using a distributed architecture.

Centralized management is accomplished via a web-based server, called the 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 Windows-based development systems used for authoring and tailoring of automations. Bot Runners execute the automations; they are run-time systems installed on Windows machines. Bot Runners can be deployed on desktops or on virtual machines (VM) in data centers or cloud. Only Bot Creators and Bot Runners that are authenticated to the Enterprise Control Room may develop and execute automations.

Figure 1. Client Server Deployment

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



## Solution Components

AAE's distributed architecture consists of a Control Room, a Windows-based server, and Bot Creators and Bot Runners that are Windows-based clients.

AAE's distributed architecture consists of two components:

- Enterprise Control Room installed on a Windows-based server,
- Enterprise client the interface for Bot Creator and Bot Runner functions, also installed on Windows-based machines.

No confidential or sensitive personal data is retained or stored within the Control Room, Bot Creators or Bot Runners. Only Bot Insight, AAE's embedded analytics engine, can be configured to store data.

- **Bot Creator: Development Client**

Bot creators are used for authoring and unit testing of automation.

- **Bot Runners: Runtime Client**

Users on the CR can schedule and execute the Bot on an authorized Bot Runner(s).

### Bot Creator: Development Client

Bot creators are used for authoring and unit testing of automation.

Bot creators run on Windows and must authenticate against an active CR, on a fail-safe principle. Bot Creators only access the CR to upload and download bots.

Developed bots are uploaded to the Version Control System on the CR for application of Software Design Lifecycle Controls (SDLC) best practices to preserve Bot Integrity with features to check-in, check-out, rollback, compare across bot versions. Below is a brief description of the Development Client and associated nomenclature.

### TaskBots

TaskBots: are used to automate rule-based business processes which use structured data. TaskBots are built using solution accelerators (such as SMART Recorder, extensive command library) available in Bot Creator. TaskBots are built for Object-based, Image-based or Coordinate-based automation, depending on the application type. As described above, TaskBot properties can also be configured to set automation triggers, execution priority, bot timeout, bot re-runs, alert notifications and security controls.

### MetaBots

MetaBots: are reusable automation building blocks which deliver speed and scalability to the automation landscape. MetaBots are built once and can be re-used across hundreds of TaskBots and, as a result, accelerate time to value. MetaBots enables compliance to organizational Standard Operating Procedures (SOPs) since MetaBots automation must be used as a black box and cannot be altered. MetaBots facilitates offline automation by allowing automation creation even when live application is not available. MetaBots provide extensibility to the AAE platform by enabling API-based integration with third-party applications. Automations created using MetaBots can be calibrated against any changes in the business application. This means that entire automation need not be changed with change in application and makes the automation resilient.

## Bot Runners: Runtime Client

Users on the CR can schedule and execute the Bot on an authorized Bot Runner(s).

Bot Runners do not have any create or edit access to automation; Bot Runners can only execute bots. Once a bot is created and uploaded by the Bot Creator, the user on the CR can schedule and execute the Bot on an authorized Bot Runner(s).

Each of the Bot Runners must first authenticate against enterprise Active Directory by securely retrieving the user credentials from Centralized Credential Vault (CV). Next level of authentication is performed against an available CR. CR centrally deploys the automation only to authorized and authenticated Bot Runners.

All credentials are secured at-rest and in-motion according to best practices as required by NIST SC-8, Transmission Confidentiality and Integrity. When the Bot executes on Bot Runners, they securely access enterprise business applications utilizing credentials encrypted and stored in the Credential Vault (CV) or in a third-party credential store. Once the automation execution is finished, remote Bot Runners are reverted to their original state (i.e. locked or log off). All credentials provisioning is done over HTTPS. All credentials are secured through secure pre and post processing. See [Secure credential store Credential Vault](#) for more information on Credential Vault (CV).

## Network architecture and boundary controls

Communication between authorized and authenticated Bot Creators, Bot Runners, and the Enterprise Control Room use secure protocols and pass through a network firewall and a load balancer.

All communication between authorized and authenticated Bot Creators, Bot Runners, and the Enterprise Control Room use secure protocols and pass through a network firewall and a load balancer, based on customer deployment topology consistent with best practices as defined by NIST SC-7 Boundary Protections that require connections to networks only through managed interfaces using devices such as firewalls and load balancers.

All communications are denied by default and only allowed through specific services:

- Secure protocols, such as TLS 1.2, HTTPS, are used to communicate between different modules of Enterprise client and Enterprise Control Room.
- 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.

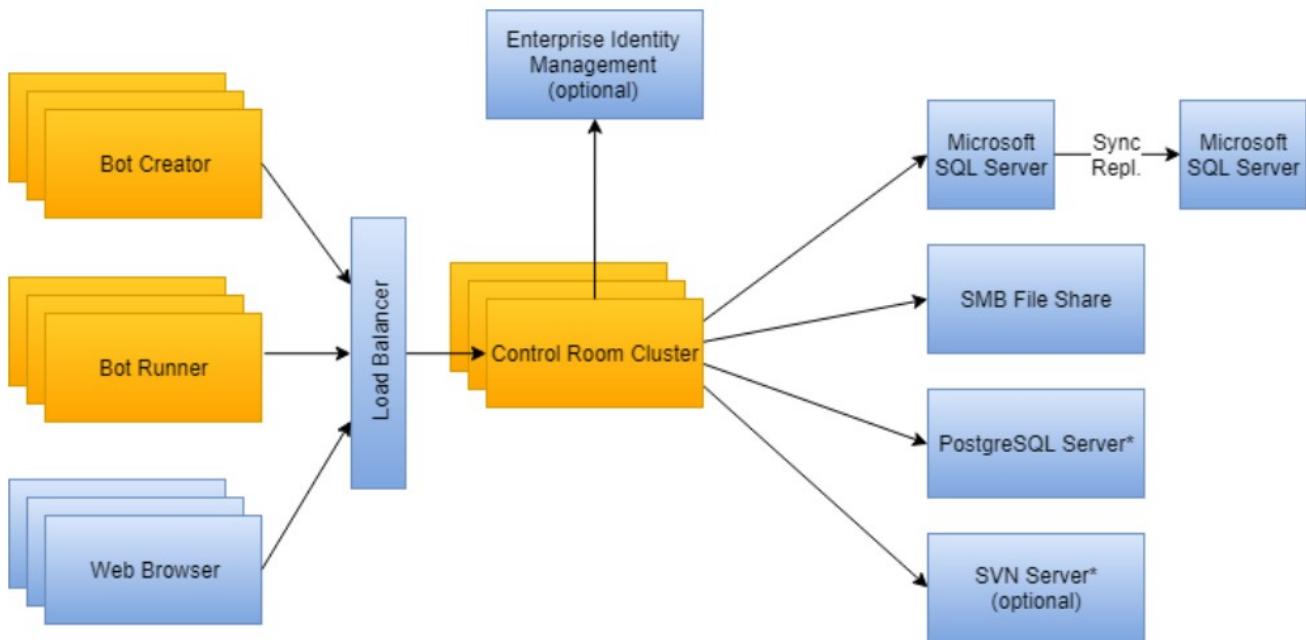
## Distributed architecture with HA/DR support

The Automation Anywhere self-contained platform within the customer environment, mitigates the risks 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):

- Automation Anywhere Web Socket Server Service
- Subversion Service
- Microsoft SQL Server 2012 and higher

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.

## HA/DR Deployment

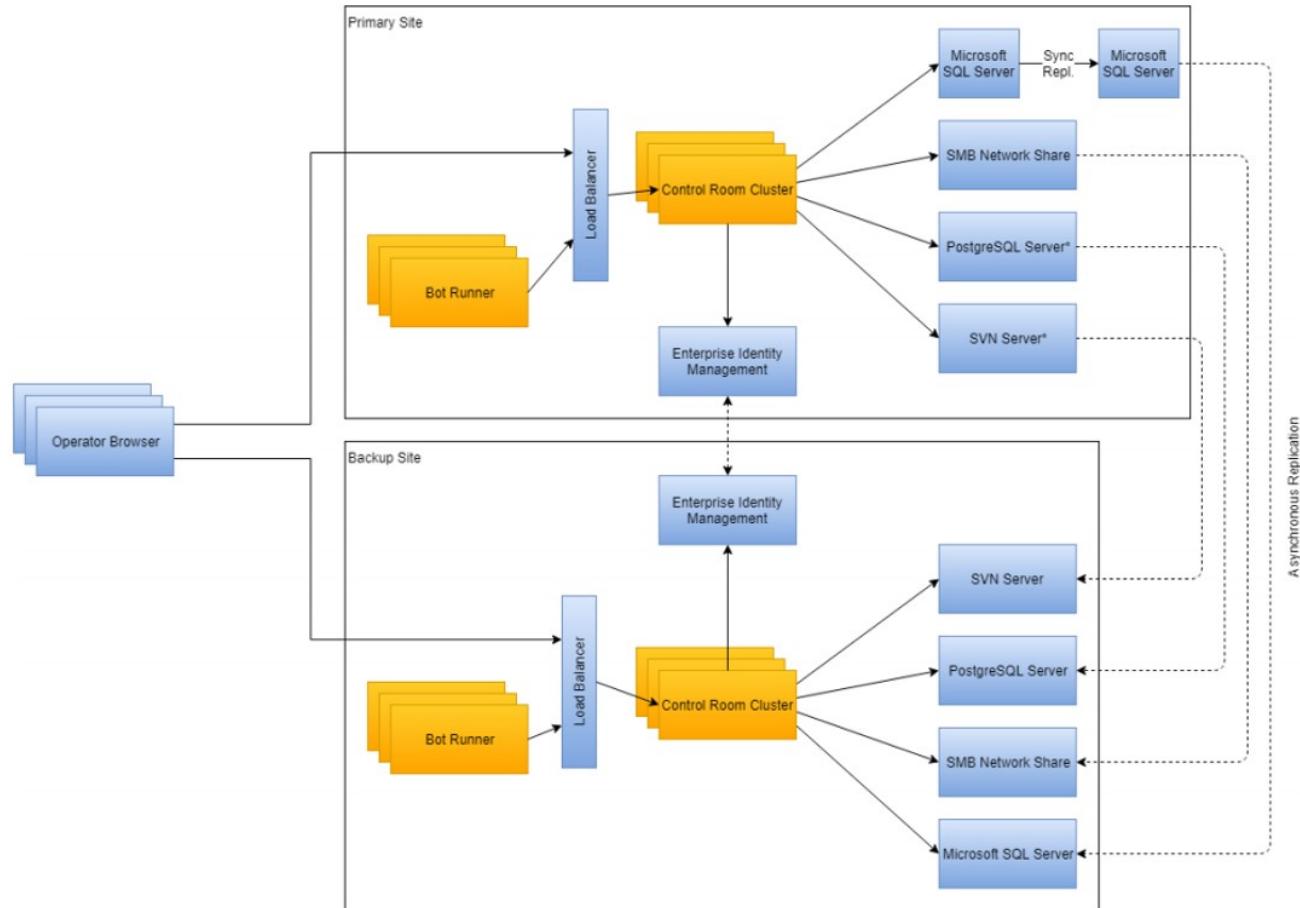
Due to the on-premise deployment, Automation Anywhere Enterprise delivers solution High Availability (HA) and Disaster Recovery (DR) using existing infrastructure and processes. All communication from Automation Anywhere Enterprise to the customer HA/DR infrastructure is over a secure HTTPS layer.

High Availability infrastructure support across multiple control rooms using a network load balancer. Network load balancing is achieved by running multiple instances of the CR and a load balancer in front of it handling

web requests. The Load Balancer can either be an external appliance (such as an F5 load balancer) or you can use the built-in Microsoft Network Load Balancer (NLB) available on Server 2012.

Clustering provides high availability and high reliability minimizing the Enterprise Control Room downtime. SQL Server high availability can be achieved using a SQL Server 2012 AlwaysOn Availability group. There is no single point of failure with always-on SQL Server and Socket Server active / passive configuration. HA/DR is also supported for single forest, multi-domain Active Directory (AD) deployment.

Figure 2. HA/DR Deployment Diagram



## 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	Control Room Feature	Security Impact
Access Controls	AC-3,6, 7,9,10,12	Central Policy Control	Enforce access restrictions for change control and Least Privileges on system components: (1) Fine grained Access to Bots & Bot Runners is controlled via RBAC, (2) Bot and Bot Runner Domains can be assigned to Roles via RBAC, (3) RBAC Roles are fully audited
		Role-based Access Control	Enables user access, restricts operational privileges, enforces least privilege principals
	AC-2,3,5,6	Bot Repository	Bot versioning system with access restrictions
	AC-17	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
		Centralized Licensing	Centralized provisioning, tracking and enforcement of Bot Dev and Bot Runner licensing
	CM-10	Bot Operations Room	
	CM-2,5,6,8	Inventory Control	Maintains centralized inventory control of all Bots and Runtimes
Dev Config Management	SA-10	Bot Creator Management, Bot Check-in, Check-out	Control Room applies software Life Cycle management to Bots from Dev, Test and Prod. Bot versioning enables change control of automations.
Audit & Accountability	AU-1 thru 15	Audit Trail	Automated event logs captured on three levels: Control Room, Bot Runners and Dev Clients. Non-repudiation is assured through read-only logs, all user identities are bound to actions, and
Identification and Authentication	IA-1 thru 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	Control Room versioning systems provides an automated mechanism to roll out updates to Bots, historical information is maintained.

(1) Resources: ISACA provides guides that map NIST SP800-53 to other security frameworks such as CoBIT (SOX), SANS Top20 (<http://www.counciloncybersecurity.org/critical-controls/tools/>) and ISO27002 (<http://www.bankinfosecurity.in/mapping-nist-controls-to-iso-standards-a-7251>).

## Data protection and access control

- [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.

- [RBAC on bots](#)

Access is deny-all and allow by exception based on roles.

- [RBAC on Bot Runners](#)

Role-based access control (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 Operations Room](#)

The Operations Room shows the real-time status of the automation running across the Enterprise.

- [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 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, domains as defined in RBAC.

- [RBAC on license management](#)

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

- [Secure application partitioning](#)

Automation Anywhere provides security options to enable and enforce secure bot execution consistent with best practices under NIST SC-2: Secure Application Partitioning.

- [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.

- [Security at-rest](#)

- [Security in-transit: support for secure protocols](#)

Automation Anywhere platform supports secure protocols such as 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.

- [Protocols in use](#)

Automation Anywhere Enterprise uses the listed protocols for task automation.

- [List of port numbers](#)

The configurable ports used by the Automation Anywhere Enterprise platform.

## 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 version control system on 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 is available based on the usage conditions assigned to each role that a user is a member of. Authorized users can also temporarily or permanently suspend users, per business needs. RBAC enforces session handling to prevent any unauthorized use. If an unauthorized user attempts to view session details or to gain unauthorized access, the Control Room cluster does not allow the user to continue, and immediately terminates the unauthorized user session. This user must log in with their credentials again. 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.

By default, the Enterprise Control Room includes segmented administrator roles. Many permissions are supported for creating new roles.

Roles (5 of 5)								
	Type	Role Name	# of Users	Last Modified	Modified By			
<input type="checkbox"/>		System-created	AAE_Admin	1	14:49:28 PST 2018-01-02	System		
<input type="checkbox"/>		System-created	AAE_Locker Admin	0	14:49:28 PST 2018-01-02	System		
<input type="checkbox"/>		System-created	AAE_Pool Admin	0	14:49:28 PST 2018-01-02	System		
<input type="checkbox"/>		System-created	AAE_Queue Admin	0	14:49:28 PST 2018-01-02	System		

A variety of permissions are supported for creating new roles:

<p><b>Role name</b></p> <div style="border: 1px solid #ccc; padding: 2px; width: 100%;"><b>XYZ Department</b></div> <p>Max characters = 255</p> <p><b>DASHBOARDS</b></p> <p><input checked="" type="checkbox"/> View dashboards</p> <p><b>ACTIVITY</b></p> <p><input checked="" type="checkbox"/> View my In progress activity</p> <p><input type="checkbox"/> View everyone's In progress activity</p> <p><input type="checkbox"/> View my scheduled bots</p> <p style="margin-left: 20px;"><input type="checkbox"/> Schedule my bots to run</p> <p style="margin-left: 20px;"><input type="checkbox"/> Edit my scheduled activity</p> <p style="margin-left: 20px;"><input type="checkbox"/> Delete my scheduled activity</p> <p style="margin-left: 20px;"><input type="checkbox"/> View and manage ALL scheduled activity</p> <p><b>BOTS</b></p> <p><input type="checkbox"/> View my bots</p> <p style="margin-left: 20px;"><input type="checkbox"/> Run my bots</p> <p style="margin-left: 20px;"><input type="checkbox"/> Export bots</p> <p style="margin-left: 20px;"><input type="checkbox"/> Import bots</p> <p><input checked="" type="checkbox"/> Manage my credentials and lockers</p> <p style="margin-left: 20px;"><input type="checkbox"/> Manage my lockers</p> <p style="margin-left: 20px;"><input type="checkbox"/> Administer ALL lockers</p> <p><b>DEVICES</b></p> <p><input type="checkbox"/> View and manage my Bot runners, Bot creators and device pools</p> <p style="margin-left: 20px;"><input type="checkbox"/> Create device pools</p> <p style="margin-left: 20px;"><input type="checkbox"/> Administer ALL device pools</p> <p><input type="checkbox"/> View and manage BotFarm</p>	<p><b>WORKLOAD</b></p> <p><input checked="" type="checkbox"/> View and manage my queues</p> <p><input type="checkbox"/> Create queues</p> <p><input type="checkbox"/> Administer ALL queues</p> <p><b>AUDIT LOG</b></p> <p><input type="checkbox"/> View everyone's audit log actions</p> <p><input type="checkbox"/> Archive audit log actions</p> <p><b>ADMINISTRATION</b></p> <p><input type="checkbox"/> View and manage Settings</p> <p><input type="checkbox"/> View users</p> <p style="margin-left: 20px;"><input type="checkbox"/> Create users</p> <p style="margin-left: 20px;"><input type="checkbox"/> Edit users</p> <p style="margin-left: 20px;"><input type="checkbox"/> Delete users</p> <p style="margin-left: 20px;"><input type="checkbox"/> View and manage roles</p> <p style="margin-left: 20px;"><input type="checkbox"/> View and manage licenses</p> <p><b>IQBot</b></p> <p><input type="checkbox"/> Access the IQ Bot Validator</p> <p><input type="checkbox"/> Access the IQ Bot Console</p>
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Controls are implemented at Enterprise Control Room, Bot Creators, and Bot Runners layers to implement NIST Access Controls (AC) and Change Management (CM) guidelines. The following technical controls are implemented to ensure access is governed through NIST Least Privileges.

## RBAC on bots

Access is deny-all and allow by exception based on roles.

Access is deny-all and allow by exception based on roles, except for admin roles, addressing NIST Access Control AC 17 and addressing NIST Change Management for establishing Base Line Configurations (NIST CM 2) access restrictions for configuration management (NI5T CM 5 and 6) and Least Functionality (NIST CM 7) and monitoring Configuration Management for bot activity across the Development, Test, and Production environment of (NIST CM 9).

## RBAC on Bot Runners

Role-based access control (RBAC) on Bot Runners facilitates complete isolation of one department Bot Runner seamlessly from the remaining departments' Bot Runners.

Bots are commanded and executed from the Control Room cluster. Local bot execution is protected through multiple layers of security, and are designed to prevent frauding 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 a user role does not have access to a set of Bot Runners, as a result, the user will not be able to view the Bot Runners execution or scheduling automation on remote Bot Runners (See [Role-based processing domains](#)).

## 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 further facilitate access control, credentials are further divided in logical groups called lockers. These lockers enable complete separation between the credentials of one department from another.

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 lockers they are given permissions for.

### Manage my lockers

Allows the user to create and manage their own lockers.

### Administer ALL lockers

User has limited actions on all lockers.

Each locker has the following permissions:

	<b>View locker</b>	<b>Edit locker</b>	<b>Delete locker</b>	<b>Add participant/owner</b>	<b>Remove participant/owner</b>	<b>View credential</b>	<b>Assign credential</b>	<b>Remove credential</b>	<b>User-specific value</b>	<b>Common value</b>
Consume	x	x	x	x	x	✓	x	x	✓	x
Participate	x	x	x	x	x	✓	✓	x	x	x
Own	✓	✓	✓	x	✓	✓	✓	✓	x	✓
Share	✓	✓	✓	✓	✓	✓	✓	✓	x	✓
Admin	✓	✓	✓	✓	✓	✓	✓	✓	x	✓

## Role-based processing domains

The Enterprise Control Room RBAC applies the least privilege principles to domains by implementing Processing Domains, specifying role-based privileges, and permissions at the bots and Bot Runners level.

RBAC is applied at a folder level to completely and seamlessly isolate one department bot from the remaining departments' bots. If the user role does not have access to a set of bots, those bots do not exist for that specific user, thereby enabling the separation of duties across different domains. For example, Finance and Accounting roles can access only the bots that automate Finance and Accounting functions and specific Bot Runners that can execute these bots. This is consistent with best practices as defined by NIST AC-4 Processing Domains.

This permission is further divided into the following subpermissions:

### Run

Only those users who have this permission can run the bots from the Enterprise Control Room to remote Bot Runners.

### Set Production Version

Only those users who have this permission to mark a specific version of a bot as a Production-ready version.

### Force Unlock

Only those users who have this permission can unlock a bot that is checked out by a user for editing.

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, 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 Operations Room

The Operations Room shows the real-time status of the automation running across the Enterprise.

Access to Operations Room is deny-all and allow by exception based on roles, domains as defined in RBAC. Two levels of checks are applied to access the Operations Room data. First, the user is required to be a member of a role which has access to view the Operations Room in Enterprise Control Room. Users with Operations Room access 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 users in system.

This permission is further divided into the following subpermissions:

### Create Users

Only those users with this permission can create new users from the Enterprise Control Room.

### Edit Users

Only those users with this permission can update existing users from the Enterprise Control Room.

### Delete Users

Only those users with this permission can 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, update, and delete roles in the system. This permission is typically assigned to administrators and power users from across the departments in an Enterprise.

## RBAC on bot schedules

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

This permission is further divided into the following subpermissions:

### Schedule my bots to run

Only those users with this permission can create new schedules.

#### Edit my scheduled activity

Only those users with this permission can update their schedules.

#### Delete my scheduled activity

Only those users with this permission can delete their schedules.

#### View and manage ALL scheduled activity

Only those users with this permission can manage (update 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, domains as defined in RBAC.

Only those users with access to license management permission are enabled to update the license from the Enterprise Control Room. A common license exists for all the users across the 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.

## Secure application partitioning

Automation Anywhere provides security options to enable and enforce secure bot execution consistent with best practices under NIST SC-2: Secure Application Partitioning.

This is essential to the execution of automations in both attended or unattended mode by preventing unauthorized access to confidential information or unauthorized tampering with the execution of a bot on virtual desktops or physical machines.

- [Stealth mode for automation](#)

Automation Anywhere enables the option to run bots in stealth mode, where a logged in user is unable to view the ongoing automation.

- [Disable mouse and keyboard](#)

The Automation Anywhere platform enables the option to separate user functionality, specifically user interface services, for example, keyboard and mouse, to prevent unauthorized tampering when bots are running.

- [Configurable automation timeout](#)

The Automation Anywhere Enterprise system enables the option to configure the time period after which a bot is terminated if it has not finished its execution.

- [Centralized control on automation running remotely](#)

The Automation Anywhere digital workforce runs across the enterprise, on remote Bot Runner systems.

## Stealth mode for automation

Automation Anywhere enables the option to run bots in stealth mode, where a logged in user is unable to view the ongoing automation.

The business application and any program windows do not show on the screen, ensuring confidentiality and privacy. In addition, stealth mode ensures that the user has no control over the running automation, including disabling any ability to pause the automation, stop the automation, or see the progress of the automation. This security capability addresses NIST SC-2 best practices for secure application partitioning.

This provides additional safeguards to a bot when a Bot Runner machine is running in either attended (shared between a bot and a human) or unattended, where the bot is executing on a virtual machine. The risk in unattended mode is from the virtual infrastructure administrator who has access to the virtual machines executing the automation and the ability to view or record processes and thereby subvert other controls. Stealth mode eliminates any chances of unauthorized access and tampering with automations.

Figure 1. Security Settings

The screenshot shows the 'Security Settings' interface. At the top, there is a table listing four tasks:

File Name	Type	Repeat	Status	Last Run Time
Bank Account Reconciliation.atmx	Task File	Do not Repeat		
Generate Audit Certificate.atmx	Task File	Do not Repeat		
Know Your Customer.atmx	Task File	Do not Repeat		
Progress Payment.atmx	Task File	Do not Repeat		

Below the table is a 'PROPERTIES' tabbed panel. The 'General' tab is selected, showing sections for 'Repeat' (with 'Run this task in stealth mode' checked), 'Speed', 'Notification', 'Hotkey', and 'Security'. The 'Security' section contains two checkboxes: 'Run this task in stealth mode' (checked) and 'Disable mouse and keyboard for this task' (unchecked). A red box highlights the 'Run this task in stealth mode' checkbox.

## Disable mouse and keyboard

The Automation Anywhere platform enables the option to separate user functionality, specifically user interface services, for example, keyboard and mouse, to prevent unauthorized tampering when bots are running.

This makes automation tamper-proof ensuring the integrity of automation data. Like stealth mode, this provides additional safeguards to a bot when a Bot Runner machine is shared between a bot and a human. For example, when this setting is on, the user cannot input unwarranted texts anywhere or select places on the screen where the user is not supposed to have access. This security capability addresses NIST SC-2 best practices for secure application partitioning.

## Configurable automation timeout

The Automation Anywhere Enterprise system enables the option to configure the time period after which a bot is terminated if it has not finished its execution.

This feature protects the Bot Runner system against any unauthorized usage when a running bot is paused by some unauthorized user and that user might try to run the automation with the tampered data. It also saves the system memory when the bot cannot finish execution. This security capability addresses NIST SC-2 best practices for secure application partitioning and NIST SI-7 Time Limits on Process Execution without Supervision.

## Centralized control on automation running remotely

The Automation Anywhere digital workforce runs across the enterprise, on remote Bot Runner systems.

All the running automations are centrally managed by only authorized users from the Control Room cluster. Running Automation Anywhere bots can be centrally paused, resumed, or completely stopped from the centralized Control Room cluster. This security capability addresses NIST SC-2 best practices for secure application partitioning.

## Bot execution access by dynamic access token

The Enterprise Control Room implements and enforces a Trusted Path for registration and authentication of Bot Creators and Bot Runners in accordance with NIST SC-11 to protect against any attempt to execute unauthorized bots.

The Enterprise Control Room issues new client access tokens or identifiers through hashing, signed by the Enterprise Control Room and sent to Bot Creators and Bot Runners over HTTPS. Every subsequent communication between Enterprise Control Room and Bot Creator or Bot Runner is serviced by the Enterprise Control Room after validation of the signature of the latest access token sent by the Bot Creator or Bot Runner. Each access token is unique to every Bot Creator or Bot Runner. This ensures that even if an unauthorized user could bypass enterprise security and access the system, the Enterprise Control Room security restricts any damage.

## Secure credential store Credential Vault

The Automation Anywhere platform provides a centralized Credential Vault to securely store all credentials and provision them to bots on an on-demand basis.

Use the Credential Vault to store other information deemed confidential or sensitive. The credential store implements NIST controls IA-2 to uniquely identify and authenticate organizational users (or processes acting on behalf of organizational users).

Sensitive information does not need to be stored in bots or on Bot Runner systems, the Credential Vault facilitates a logical separation of credentials from the bots.

Credential Vault variables are created from the Enterprise Control Room and are instantly available to all the Bot Creators and Bot Runners registered with the respective Enterprise Control Room. Credential Vault adds flexibility and dynamic character to bots because only the credential references are present in the bots, and not the credentials. When bots are moved from one environment to another environment, absolutely no change is required in the bots. Bots can seamlessly pick up the credentials values applicable for the new

environment from the Enterprise Control Room of that environment. Additionally, the Enterprise Control Room automatically stores configuration-related sensitive data into the Credential Vault by default.

- [Credential Vault encryption](#)

The Automation Anywhere Enterprise Control Room installation generates the Master key and Data encryption key.

- [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.

## Credential Vault encryption

The Automation Anywhere Enterprise Control Room installation generates the Master key and Data encryption key.

The Automation Anywhere Enterprise Control Room installation generates the following two keys:

### Master key

This RSA-2048 bit key is managed by an administrator outside of the system. This key unlocks the Credential Vault. The administrator types the Master key each time the Enterprise Control Room is started. When the vault is open, the master key is immediately erased from memory and it is not stored anywhere in the Automation Anywhere Enterprise product.

### Data encryption key

This AES-256 bit key is stored in the Enterprise Control Room database and is used to encrypt and decrypt the credentials at the time of storage or provisioning. This key is encrypted using the Master key. The Data encryption key does not leave the Credential Vault at any time. Credential encryption and decryption are done at the Credential Vault.

## Credential storage

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

These credentials are encrypted by the Credential Vault service to conform to NIST SC-28 and to prevent unauthorized access or disclosure of credentials. Only encrypted credentials travel from the Enterprise Control Room to the Database server and are stored in the database in an encrypted form. The data encryption key encrypts all credentials using an AES 256-bit key generated by a FIPS 140-2 Level 1 validated module to meet the NIST IA-7, SC-12, and 13 requirements for implementation of mechanisms for authentication to a cryptographic module that meets the requirements of applicable federal laws.

The following data is also encrypted and securely stored in the Credential Vault with thebot credentials:

- User Active Directory credentials for autologin to Bot Runners
- Version Control System 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.

Figure 1. Encrypted password in system memory

	00	01	02	03	04	05	06	07	08	09	0a	0b	0c	0d	0e	0f
00e70b06	73	69	6f	6e	22	3a	30	7d	5d	2c	22	4e	61	6d	65	22
00e70a40	sion":0}], "Name":															
00e70a50	: "Basic", "Domain															
00e70a60	3a	22	42	61	73	69	63	22	2c	22	44	6f	6d	61	69	6e
00e70a70																
00e70a80	49	64	22	3a	31	2c	22	49	64	22	3a	33	2c	22	52	6f
00e70a90	"Id":1, "Id":3, "Ro															
00e70aa0	77	56	65	72	73	69	6f	6e	22	3a	30	7d	2c	22	55	73
00e70ab0	wVersion":0], "Us															
00e70ac0	65	72	22	3a	7b	22	24	72	65	66	22	3a	22	32	22	7d
00e70ad0	er": ["\$ref": "2"]															
00e70ae0	2c	22	55	73	65	72	49	64	22	3a	34	30	2c	22	52	6f
00e70af0	,"UserId":40, "Ro															
00e70aa0	6c	65	49	64	22	3a	33	2c	22	44	6f	6d	61	69	6e	49
00e70ab0	leId":3, "DomainI															
00e70ac0	64	22	3a	31	2c	22	49	64	22	3a	34	37	2c	22	52	6f
00e70ad0	d":1, "Id":47, "Ro															
00e70ae0	77	56	65	72	73	69	6f	6e	22	3a	36	33	35	38	37	33
00e70af0	wVersion":635873															
00e70aa0	32	34	37	34	39	36	36	37	33	37	37	30	7d	5d	2c	22
00e70ab0	247496673770], "															
00e70ac0	46	69	72	73	74	4e	61	6d	65	22	3a	22	68	22	2c	22
00e70ad0	FirstName": "h", "															
00e70ae0	4c	61	73	74	4e	61	6d	65	22	3a	22	22	2c	22	45	6d
00e70af0	LastName": "", "Em															
00e70aa0	61	69	6c	22	3a	22	[68]	65	6d	61	6c	2e	72	61	76	61
00e70ab0	ail": "hemal1rava															
00e70ac0	6c	40	61	75	74	6f	6d	61	74	69	6f	6e	61	6e	79	77
00e70ad0	l@automationanyw															
00e70ae0	68	65	72	65	26	63	6f	6d	22	2c	22	55	73	65	72	4e
00e70af0	name": "hemal1", "Pa															
00e70aa0	61	6d	65	22	3a	22	68	65	6d	61	6c	22	2c	22	50	61
00e70ab0	ame": "hemal1", "Pa															
00e70ac0	73	73	77	6f	72	64	22	3a	22	35	64	30	64	31	63	62
00e70ad0	ssword": "5d0d1cb															
00e70ae0	31	62	65	38	36	33	37	64	66	34	34	37	31	32	61	30
00e70af0	1be8637df44712a0															
00e70aa0	37	63	31	62	65	34	31	64	31	22	2c	22	41	44	44	6f
00e70ab0	7c1be41d1", "ADD0															
00e70ac0	6d	61	69	6e	22	3a	22	22	2c	22	49	73	4c	6f	63	6b
00e70ad0	main": "", "ISLOCK															
00e70ae0	65	64	22	3a	66	61	6c	73	65	2c	22	54	6f	6b	65	6e
00e70af0	ed": false, "Token															
00e70aa0	22	3a	6e	75	6c	6c	2c	22	47	55	49	44	22	3a	22	39
00e70ab0	:	null, "GUID": "9														
00e70ac0	33	63	65	35	61	65	36	2d	64	39	66	65	2d	34	35	63
00e70ad0	3ce5ae6-d9fe-45c															
00e70ae0	65	2d	62	31	35	30	2d	64	31	31	64	65	65	35	30	63
00e70af0	e-b150-d11dee50c															
00e70aa0	38	61	65	22	2c	22	49	73	45	6d	61	69	6c	56	65	72
00e70ab0	8ae", "IsEmailVer															
00e70ac0	69	66	69	65	64	22	3a	74	72	75	65	2c	22	49	73	44
00e70ad0	ifield": true, "IsD															
00e70ae0	65	6c	65	74	65	64	22	3a	66	61	6c	73	65	2c	22	4c
00e70af0	elated": false, "L															
00e70aa0	61	73	74	4c	6f	67	65	64	49	6e	43	6c	69	65	6e	astLoggedInClien
00e70ab0	tId": 23, "Activit															
00e70ac0	74	49	64	22	3a	32	33	2c	22	41	63	74	69	76	69	74
00e70ad0	yAt": "2016-01-02															
00e70ae0	79	41	74	22	3a	22	32	30	31	36	2d	30	31	2d	30	32
00e70af0	T09:49:56.282807															
00e70aa0	54	30	39	3a	34	39	3a	35	36	2e	32	38	32	38	30	37

## Security at-rest

- [Credentials Storage in CV](#)  
All sensitive data is stored in Credential Vault using AES-256 encryption.
- [Workload management](#)  
The workload management (WLM) 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.
- [PGP action](#)  
The Automation Anywhere PGP action adds security to the unsecured data with encryption.
- [Secure recording](#)  
The Automation Anywhere platform allows enabling or disabling of image captures of business applications by clicking a button.
- [Protection of software binaries](#)  
All binary files are digitally signed with our company's certificate This adds to security at binary level. It also allows product files to be not detected as a virus by your enterprise anti-virus.

## Credentials Storage in CV

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

Along with the credentials for bots, the following data is also encrypted and securely stored in CV:

- User AD credentials for auto-login to Bot Runners
- Version Control System credentials

## Workload management

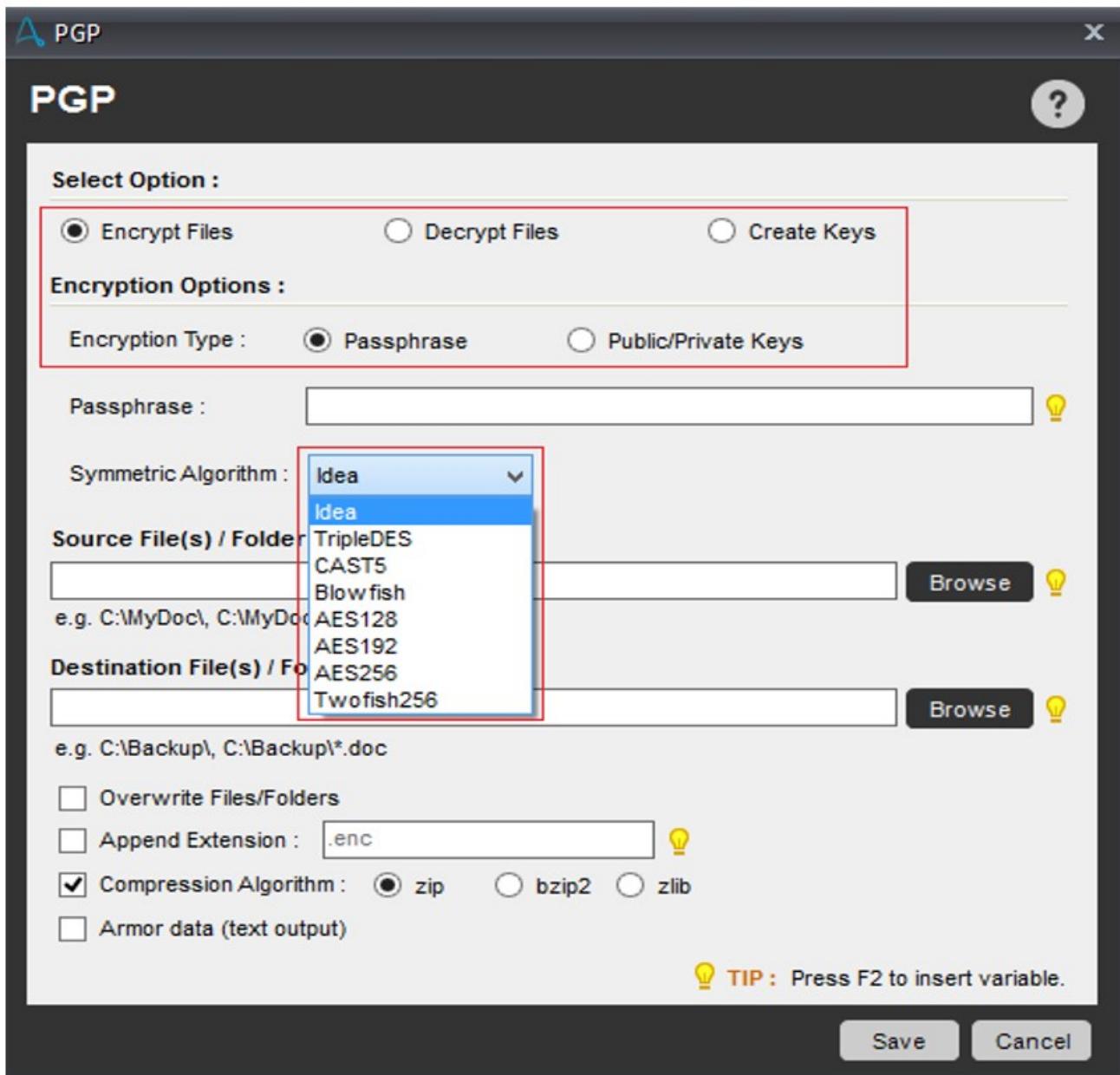
The workload management (WLM) module enables users to upload Microsoft Excel and CSV files to the Enterprise Control Room so that it feeds the records from the files into the bot deployments.

## PGP action

The Automation Anywhere PGP action adds security to the unsecured data with encryption.

Encryption and decryption is done using the Passphrase field or with public/private keys. A symmetric algorithm is used for both the options. Users choose to use any of the symmetric algorithms from the eight supported algorithms, including AES-256.

Figure 1. PGP command



## Secure recording

The Automation Anywhere platform allows enabling or disabling of image captures of business applications by clicking a button.

When secure recording is enabled, no Bot Creator or Bot Runner can capture the application images, values, or texts. This results in no sensitive data, intentionally or unintentionally, being stored in the bots, in the form of images. The remaining automation data, for example, UI object details are captured, continues to be captured and automation works seamlessly. This setting is applied from the Enterprise Control Room and is applicable for all Bot Creators and Bot Runners.

## Protection of software binaries

All binary files are digitally signed with our company's certificate. This adds to security at binary level. It also allows product files to be not detected as a virus by your enterprise anti-virus.

## Security in-transit: support for secure protocols

Automation Anywhere platform supports secure protocols such as TLS 1.2 and HTTPS data transfer.

Automation Anywhere Enterprise uses secure protocols TLS 1.2 and HTTPS for data transfer.

- Bot deployment from Enterprise Control Room to remote Bot Runners uses TCP + TLS 1.2 protocols.
- Bot upload and download from Bot Creator to Enterprise Control Room uses HTTPS protocol.
- Credentials are encrypted using RSA 2048 bit.
- Transfer of encoded credentials between Enterprise Control Room, Bot Runner, and Bot Creator uses existing layer of Transport Layer Security (TLS).
- Transfer of any information from Enterprise Control Room to database and vice versa uses TDS + TLS 1.2 protocols.
- Distributed caching and messaging communication between Enterprise Control Room servers and Caching Service services, using TLS for secure data in motion.
- WebSocket communication with the real time data service in Enterprise Control Room uses HTTPS protocol.

- **Authentication with Enterprise Control Room**

When a Bot Creator or Bot Runner tries to connect to Enterprise Control Room, the credentials are encrypted using RSA (2048 bits key length) and then transmitted on top of the existing layer of Transport Layer Security (TLS).

- **Securing communication between Enterprise Control Room and Enterprise client**

User can configure to choose the communication protocol between Enterprise Control Room server and clients. We recommend using HTTPS in a production environment and also enable users to configure forcing HTTP traffic to more secure HTTPS traffic.

- **Securing communication between Enterprise Control Room and database**

Automation Anywhere Enterprise Control Room allows users to configure a secure connection between Enterprise Control Room and database. Secure connection encrypts all communications between Enterprise Control Room and database and provides additional security to all data exchanged.

## Authentication with Enterprise Control Room

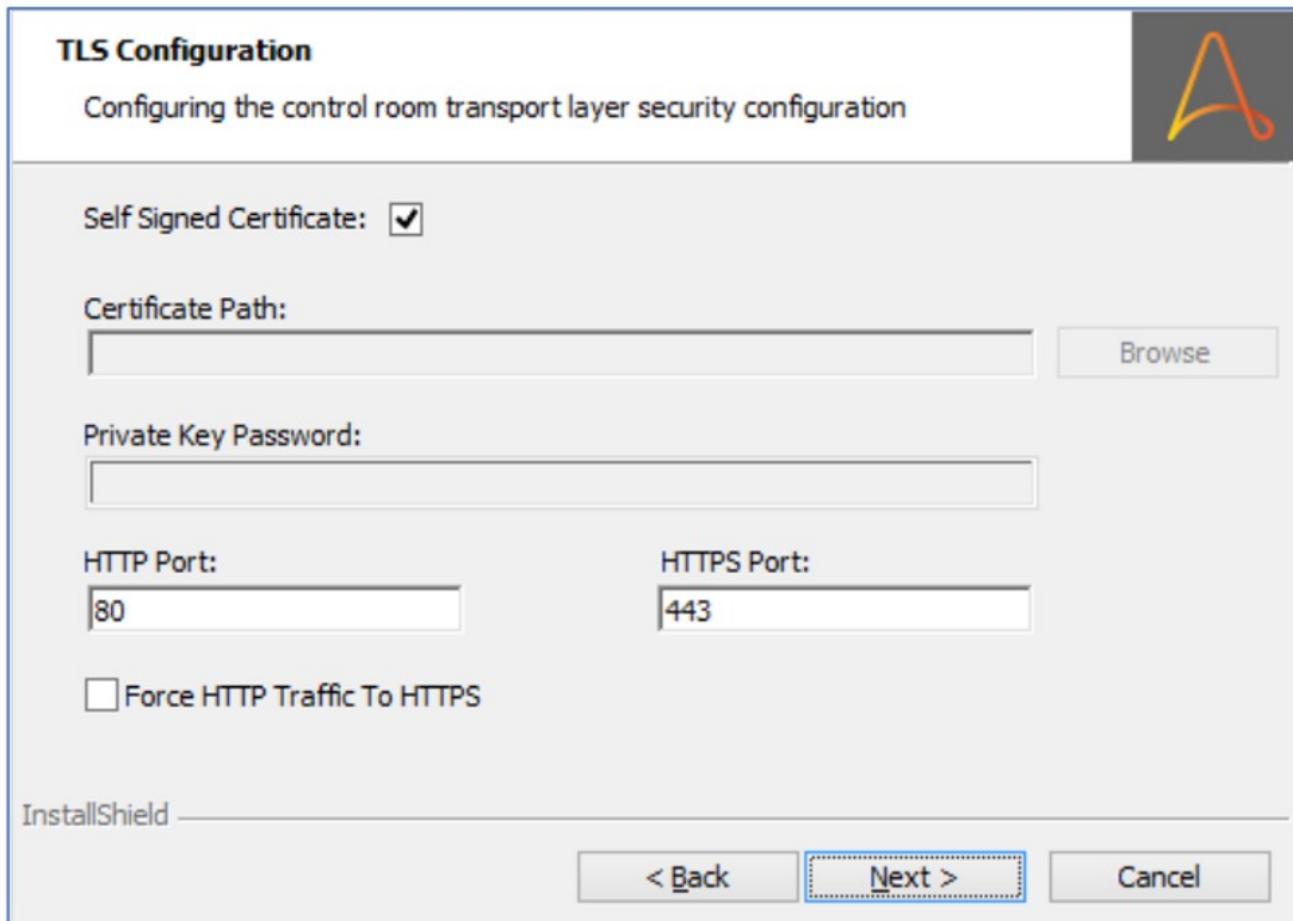
When a Bot Creator or Bot Runner tries to connect to Enterprise Control Room, the credentials are encrypted using RSA (2048 bits key length) and then transmitted on top of the existing layer of Transport Layer Security (TLS).

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).

## Securing communication between Enterprise Control Room and Enterprise client

User can configure to choose the communication protocol between Enterprise Control Room server and clients. We recommend using HTTPS in a production environment and also enable users to configure forcing HTTP traffic to more secure HTTPS traffic.

Figure 1. Protocol Configuration during Control Room installation



## Securing communication between Enterprise Control Room and database

Automation Anywhere Enterprise Control Room allows users to configure a secure connection between Enterprise Control Room and database. Secure connection encrypts all communications between Enterprise Control Room and database and provides additional security to all data exchanged.

Figure 1. Secure Communication between CR and database

**Database Server**

Select database server and authentication method



**Database Server (For eg. Server,Port)**

(local)  Database Port: 1433

Use Secure Connection

Certificate (Optional):

Windows authentication  Sql Server authentication

Login ID:  Password:

**Name of Control Room database:**

CRDB-NEW

**Name of Bot Insight database:**

BotInsight

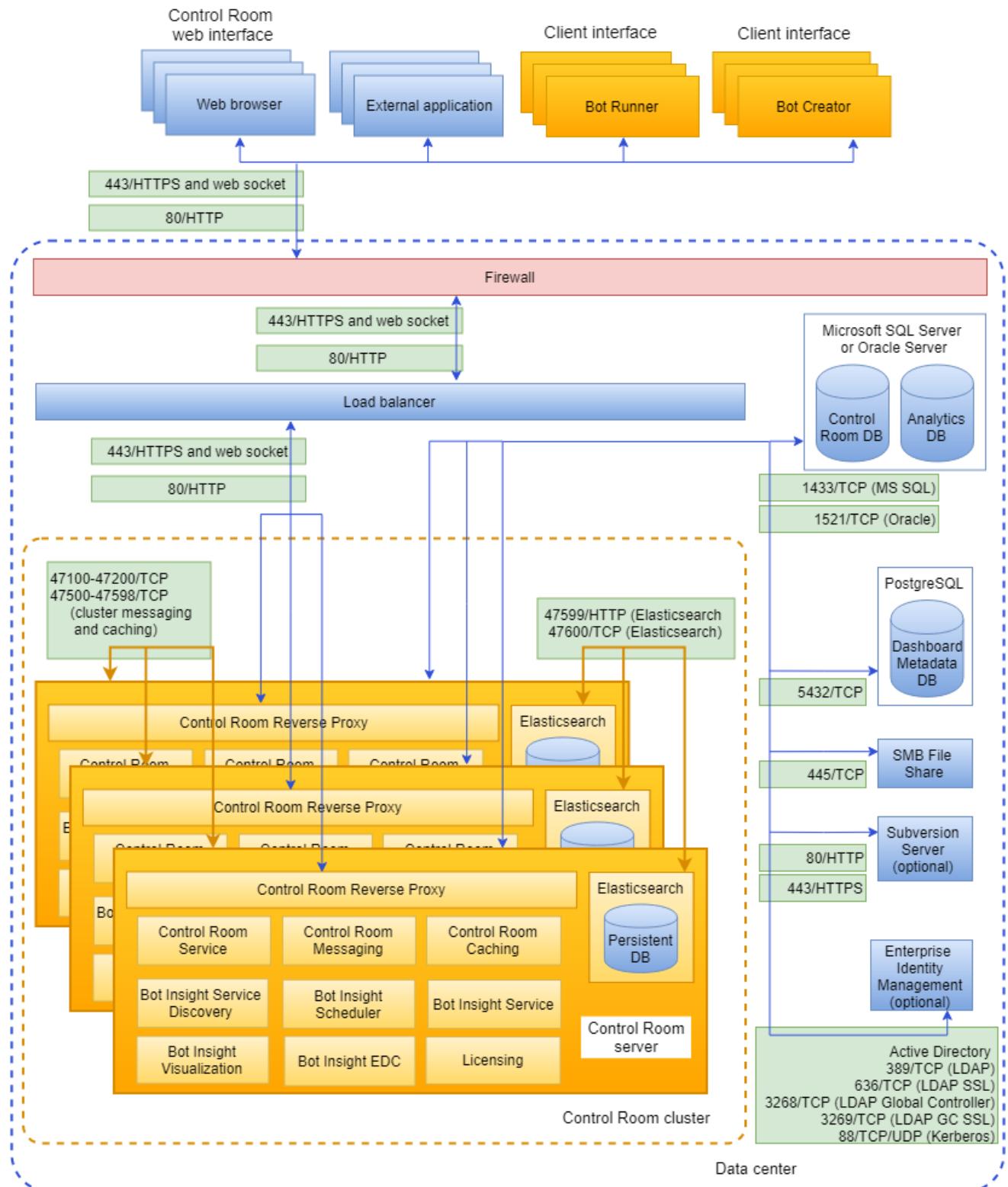
InstallShield

## Network security overview

All communication between the Enterprise Control Room, Bot Creators and Bot Runners is done using outbound WCF TLS 1.2 communications and inbound HTTPS TLS 1.2.

Bot deployment to remote bot runners, provisioning of credentials, automation scheduling, and event capture are done exclusively through the Enterprise Control Room. Use only HTTPS in the Production environment. The following figures shows the web Enterprise Control Room architecture and network and the ports used are listed:

Figure 1. Network diagram



Additional considerations:

- 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 Automation Anywhere Enterprise client makes REST calls for user authentication and repository operations, for example, upload a task, download a task, or compare two tasks.
- The AAClientService makes REST calls to validate user session at regular intervals. The Enterprise Control Room deploys and runs a task on a specific client using AAClientService. It uses a TCP/IP channel.
- The Scheduler Service makes REST calls for autologin credentials. It also communicates to the AAClientService to get a license and user session-related information.
- The Player makes REST calls to get autologin credentials for a logged-in client. It also communicates to the AAClientService to get the license and user session-related information.

## Protocols in use

Automation Anywhere Enterprise uses the listed protocols for task automation.

Table 1. List of Protocols

Sr. No	Protocol	Deployment
1	SNMP	Client
2	IMAP	Client
3	SFTP	Client
4	POP3	Client
5	HTTPS	Client & Control Room
7	TCP/IP	Client & Control Room
8	TLS	Control Room
9	SMTP	Client & Control Room
10	SOAP	Client
11	Named Pipes	Client
12	Kerberos (if configured)	Control Room

## List of port numbers

The configurable ports used by the Automation Anywhere Enterprise platform.

## Enterprise client required ports

Protocol	Ports	Rule
TCP	943 and 4530	Client inbound

## Enterprise Control Room required ports

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, excepting the Enterprise Control Room servers, block all other network hosts from accessing the listed Automation Anywhere cluster communication ports.

Note: The open ports listed here do not include ports that are inaccessible to remote hosts, as they are bound to the local host and typically dynamically assigned.

The following table lists the open port requirements. Unless noted, open the ports on the Enterprise Control Room server.

Protocol	Incoming Port	Usage	What's Connecting
HTTP	80	HTTP	Web browsers Bot Runners Bot Creators
HTTPS	443	HTTPS and Web Socket	Web browsers Bot Runners Bot Creators
TCP	1433	Microsoft SQL Server	Enterprise Control Room Services Bot Insight services In this case, open the port on Microsoft SQL Server, not the Enterprise Control Room.
TCP	5672	Cluster Messaging	Enterprise Control Room Services
TCP	47500 – 47600	Cluster Messaging and Caching	Enterprise Control Room Services

Protocol	Incoming Port	Usage	What's Connecting
TCP	47100 – 47200	Cluster Messaging and Caching	Enterprise Control Room Services
TCP	47100 – 47200	Cluster Messaging and Caching	Open ports on both the Enterprise Control Room and the IQ Bot servers
HTTP	47599	Elasticsearch	Enterprise Control Room Services
TCP	47600	Elasticsearch	Enterprise Control Room Services

Table 1. Port Numbers

Port	Description	Deployment	Used for
110 995	POP3	Client	Email Automation command to retrieve emails from mail server.
143 993	IMAP	Client	
21	FTP/SFTP	Client	FTP/SFTP command
25 465 587	SMTP	Client	Send email, Error handling command Email notification feature
161	UDP	Client	SNMP command
22 23	Terminal Emulator	Client	Terminal Emulator command
4530	TCP	Client (AAProxyServer.exe)	Used by the client to communicate with plug-ins via a TCP socket for the AAE Client, Editor, or Player

Table 2. Enterprise Control Room

80	HTTP	Control Room	Web UI access (no TLS)
443	HTTPS	Control Room	Web UI access
1433	TCP	Microsoft SQL Server	Default port used by Microsoft SQL Server
5672	TCP	Control Room	Cluster messaging
47500-47600	TCP	Control Room	Cluster messaging and caching
47100-47200	TCP	Control Room	Cluster messaging and caching

## Change management

Access restrictions for configuration management.

### Versioning and operational control:

From a security perspective, the version system previously described establishes Base Line Configurations (NIST CM 2) access restrictions for configuration management (NI5T CM 5 and 6) to deliver controlled maintenance (NIST CM 8) and Development Configuration Management (NIST SA 10). The Bot Creator does check-in, check-outs into the Enterprise Control Room-based VisualSVN system. The Enterprise Control Room enforces version control as bots are deployed to Bot Runners. The version system in the Enterprise Control Room maintains a common bot baseline, with detailed configuration logs, and rollback capability. This is commonly used for access restrictions to the Bot Repository for change control and restricting the Least Privileges for operational control.

### 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.

## 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).

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 any automation data. See [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.

- [Supported authentication methods](#)

Enterprise Control Room supports the listed authentication methods.

- [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.

- [Auto logoff](#)

The Automation Anywhere Enterprise platform complies with information security guidelines regarding user session timeout because of inactivity.

- [Authentication for Bot Creators](#)

Bot Creator must authenticate against Enterprise Control Room for any operations on the Bots.

- [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.

- [Integration with third-party identity and access management solutions](#)

The Automation Anywhere Enterprise platform supports seamless integration with privileged access management solutions, for example, CyberArk, TPAM, and Thycotic.

## Supported authentication methods

Enterprise Control Room supports the listed authentication methods.

## Supported authentication methods

- [Active Directory](#) using LDAP
- Active Directory using Kerberos
- [Security Assertion Markup Language](#)

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.

Maintainability

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 via the Credential Vault. Passwords are hashed using the HMAC SHA512 algorithm, which is keyed by the output of the Password-Based Key Derivation Function (PBKDF2). User passwords are encrypted in transit via TLS 1.2.

All authentication and session management is handled via the well-tested Spring Security framework. Kerberos integration is provided via the well-tested Waffle framework. SAML integration is provided via the well-tested OneLogin framework.

## Multi-domain Active Directory support

Automation Anywhere platform architecture supports single-forest multi-domain Active Directory integration. Enterprise Control Room can be configured with Active Directory Global Catalogue Server in a way that Enterprise Control Room, Bot Creators and Bot Runners can all be in 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 Control Room user provisioning from different Active Directory domains is also seamless. It enables the Enterprise Control Room admin to centrally orchestrate the digital workforce running across the globe.

## 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 Password-Based Key Derivation Function (PBKDF2) with HMAC SHA512 algorithm before being stored in the database.

- The salt is 256-bits in size and 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 PBKDF2.
- Hashing is done for 100,000 rounds (based on NIST recommendations).

Every time a Bot Creator or Bot Runner authenticates against Enterprise Control Room, its credentials are authenticated against the hashed credentials.

## Authentication failure messages

If an authentication attempt fails, the Automation Anywhere Enterprise platform does not specifically state if the username or password is incorrect. It only states that the supplied credentials are incorrect.

This is one critical information security requirement for Automation Anywhere Enterprise customers and defends the system against a brute force attack.

This authentication involves the following:

- Bot Creator, Bot Runner connection to Control Room
- User log in to the Control Room from the browser
- Connection from the Control Room to the SQL Server

All failed authentication attempts are logged. See [Audit Logs for authorized user activity](#). Audit log access is provided as per Role-Based Access Control (RBAC) and Audit logs are made available on a read-only basis for all users.

## Auto logoff

The Automation Anywhere Enterprise platform complies with information security guidelines regarding user session timeout because of inactivity.

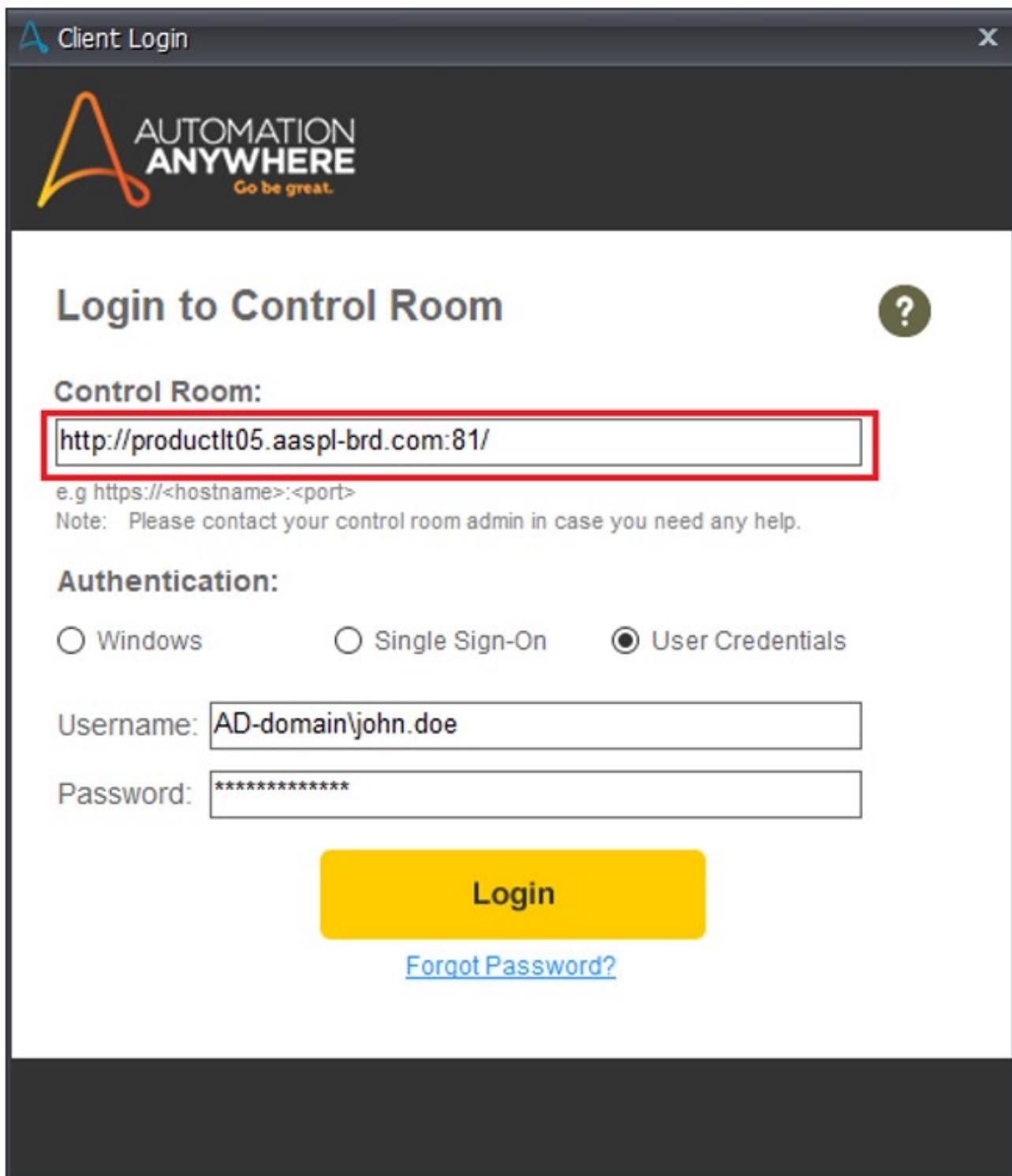
An active session with Enterprise Control Room is terminated after a predefined time interval when it is not being used. Users are automatically logged-off after an idle period of 20 minutes. Similarly, an Enterprise client session is terminated after eight hours.

## Authentication for Bot Creators

Bot Creator must authenticate against Enterprise Control Room for any operations on the Bots.

The system obscures feedback of authentication information during the authentication process to protect the information from possible exploitation and use by unauthorized individuals as required by NIST IA-6. User may choose to authenticate using Kerberos, SAML 2.0 protocols or by entering the user credentials for non-Active Directory Enterprise Control Room.

Figure 1. Bot Creator and Bot Runner authentication



In addition to TLS, users' passwords to connect to Enterprise Control Room are encrypted at the message level during transit, implemented using RSA (2048) + AES (256) + HMAC (SHA256).

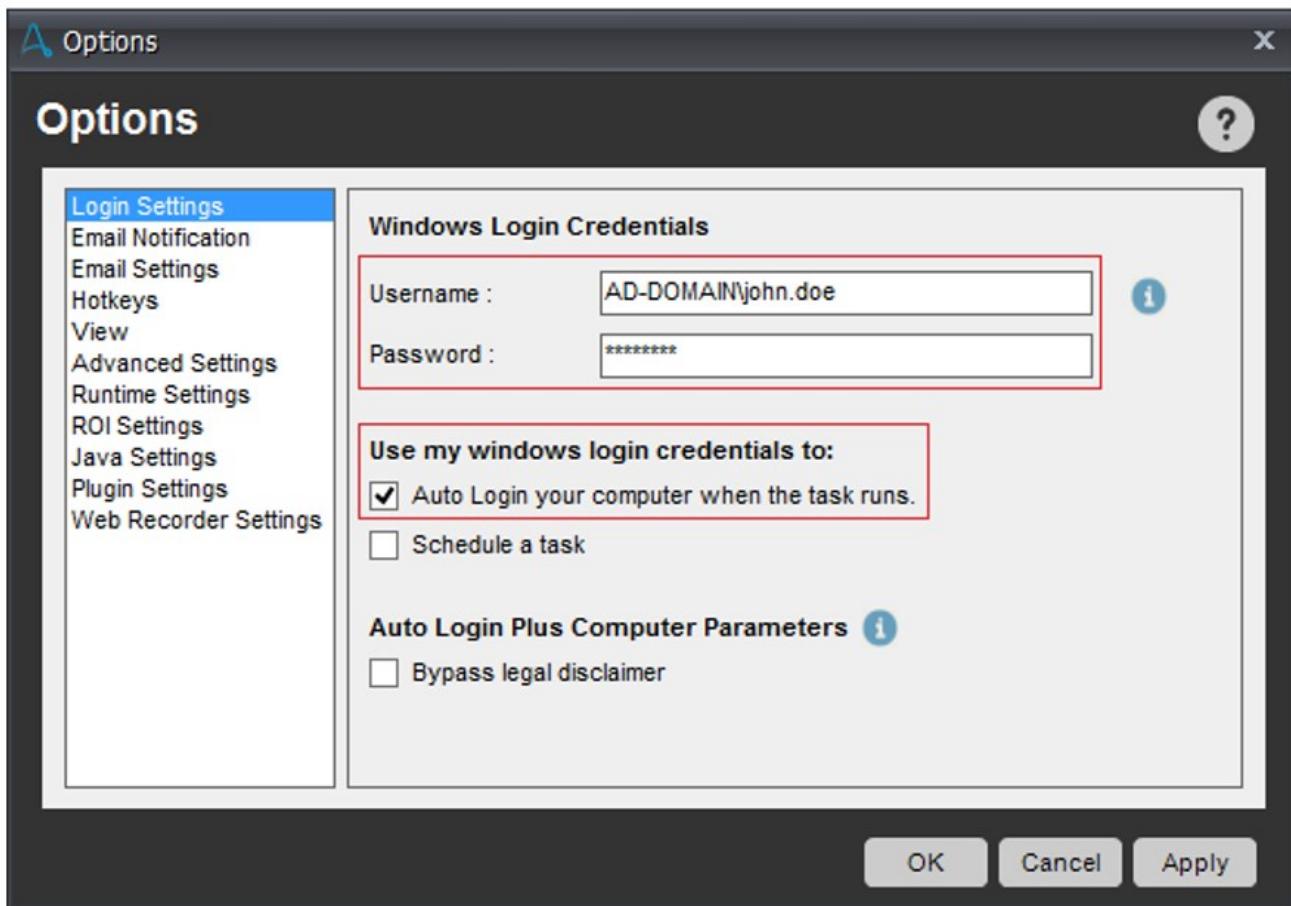
## Authentication for Bot Runners

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

The logged off, disconnected, and locked 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.

Figure 1. Bot Runner Auto-login



## Dynamic access token authentication of Bot Runners:

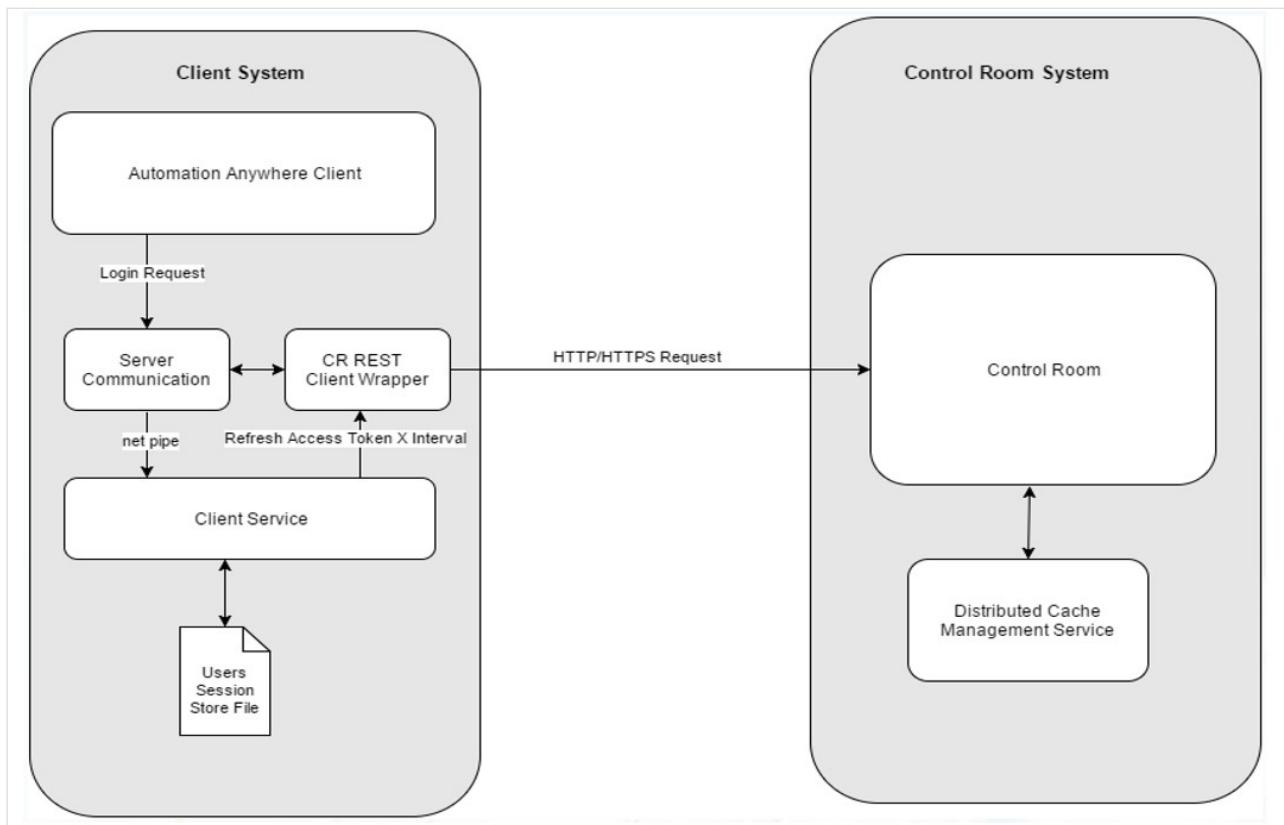
The Enterprise Control Room implements and enforces a Trusted Path for registration and authentication of Bot Creators and Bot Runners in accordance with NIST SC-11.

The Automation Anywhere Enterprise platform protects the automation data against any attempt to subvert the path. The Enterprise Control Room issues new client access tokens, or identifiers, after a predefined time period. These tokens are protected to conform to NIST IA-5 by being signed by the Enterprise Control Room.

and sent to Bot Creators and Bot Runners over HTTPS. Every subsequent communication between the Enterprise Control Room and Bot Creator/Bot Runner is serviced by the Enterprise Control Room only after validation of the signature of the latest access token sent by the Bot Creator/Runner.

The access token is unique to every Bot Creator/Bot Runner. This protects the system from an unauthorized attempt to bypass security and execute an unauthorized bot, and is consistent with the best practices to conform to NIST IA-9 Service Identification and Authorization. These controls implement IA-3 for cryptographically based bidirectional authentication and attestation of Bot Runners and Bot Creators before establishing connections. This also addresses requirements around unique, automated, identifier management IA-4 for multiple forms of authorization and identification. Identifiers are dynamically managed for audit and control purposes. Identifiers are used as authenticators and managed for verification on initial deployment, revoke, and prevent reuse. There are no static, unencrypted, identifiers in use by Bot Creators or Bot Runners and cached tokens are cleared periodically.

Figure 1. Dynamic Access Token



## Integration with third-party identity and access management solutions

The Automation Anywhere Enterprise platform supports seamless integration with privileged access management solutions, for example, CyberArk, TPAM, and Thycotic.

## CyberArk

Automation Anywhere provides integration with CyberArk, the leading privileged account security solution. Enterprises can decouple business applications' credential management from the platform. Bot Creators and Bot Runners can use the credentials stored in the CyberArk repository. Using CyberArk credentials, Automation Anywhere Enterprise bots authenticate against business applications.

## Defenses against common vulnerabilities

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

The list below contains several examples of these attacks and the security controls in place to prevent them.

### SQL Injection (SQLi)

SQL injection is a high-risk vulnerability that can seriously impact the confidentiality, integrity, and availability of a database. It enables an attacker to execute any SQL of his or her choosing inside the DB, thus allowing them to read sensitive data, modify/insert data, and execute various operations.

The Enterprise Control Room prevents SQL injection using query provided by the Hibernate framework.

### Cross Site Scripting (XSS)

Cross-site scripting is a high-risk vulnerability that can seriously impact the confidentiality, integrity, and availability of any user web session. It enables an attacker to execute any JavaScript inside the victim's browser, allowing them to spy on the user's input/output or take unauthorized actions on behalf of the user. They could also redirect the user offsite to a malicious malware download or a credential phishing page.

The Enterprise Control Room prevents cross-site scripting using automatic output encoding provided by the ReactJS framework.

### OWASP Top 10

Automation Anywhere Enterprise provides the following controls to protect against the OWASP Top 10:

Risk	Control
A1: Injection	All input is escaped before commands or queries are executed.
A2: Broken authentication and session management	See the identification and authentication section.
A3: Cross-site scripting	All output is encoded before being returned.
A4: Insecure direct object references	Centralized authorization via Spring Security.
A5: Security misconfiguration	No default passwords, stack traces hidden, secure server configuration

Risk	Control
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.

### 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.

### Nessus vulnerability scanning network vulnerability analysis

The Automation Anywhere Enterprise platform undergoes automated Nessus vulnerability scanning before every release to identify the vulnerabilities, policy-violating configurations, and malware that attackers could use to penetrate Automation Anywhere. Results are immediately fed back to the development plan and any vulnerabilities are corrected before release. A report is available.

As a matter of policy, Automation Anywhere is committed to make reasonable efforts to mitigate or remediate critical and high vulnerabilities within 30 days of identification of a new vulnerability on any supported products. These policies conform to NIST RA-5 requirements.

## 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.

## Auditing and Logging

- [Audit Logs for authorized user activity](#)

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.

- [Activity logging for bot activity](#)

For every Bot Creator and Bot Runner, Automation Anywhere performs a comprehensive activity logging for bots, workflows, reports etc.

- [Bot version control](#)

The Enterprise Control Room offers a full-fledged version control system for TaskBots, MetaBots, Workflow, files etc. Version control is provided via integration with Visual Subversion (SVN) to provide enterprise strength version management necessary to meet NIST SA-10 Developer Configuration Management requirements.

- [Email alert notifications](#)

Events captured and logged can also be configured as alerts. Email notification can be setup to have users notified when an event is detected.

## Audit Logs for authorized user activity

The Automation Anywhere Enterprise platform provides a comprehensive and centralized audit logging of all automation activities to authorized users. Role-based access control to Audit Log is managed through the Enterprise Control Room. More than 60 audit actions are logged.

All valid and invalid attempts of actions are logged. Events are logged by the following factors:

Doer of the action

For example, a username.

Source of the action

For example, Bot Runner or Enterprise Control Room

Type of event

The description of the event.

When the event occurred

For example, the date and the time of the event.

Where the event occurred

The device.

Outcome of the event

Description and status of the event.

Some key audit actions include the following:

- Log in and log out of the centralized Enterprise Control Room.
- Create, update, and delete Users.
- Activate and deactivate the Enterprise Control Room users.
- Any change of password for any user
- Create, update, and delete roles (helps in tracking changes to security policy, change in user access privileges)
- Create, update, and delete schedules
- Connection to the Credential Vault
- Create, update, and delete credentials
- Set the Production-ready version of the bots.
- 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, version control, and other settings
- Enable and disable secure recording.
- Change a license.

Create Bot Runner instance on BotFarm, release virtual machine, terminate virtual machine.

The Enterprise Control Room can be configured to export audit logs to an external log consolidation and reduction server via the Syslog protocol. This enables integration with Security Event Incident Management (SEIM) systems, for example, Splunk or LogRhythm. Configure the Syslog integration from the Settings -> Syslog page in the Enterprise Control Room.

Syslog integration uses either UDP or TCP, and is configured to use TLS encryption between the Enterprise Control Room and the remote Syslog server.

## RBAC on audit log

Audit is automated for all privileged and nonprivileged roles to conform to best practices as defined in NIST AC-6. Access is view-only based on a deny-all and allow by exception based on roles and domains as defined in the Audit Section 7 addressing Audit and Accountability (NIST AU 1 through 15) and as required by NIST AC-2 Automated System Account Management.

If a role does not have permission to view Audit Logs, the Audit Trail tab is not visible to all members of those roles. Audit automatically captures all events related to creation, modification, enable, disable, user removals, bots, Bot Creators, and Bot Runners.

## Enterprise Control Room Bot Creator and Bot Runner activity logging

For every Bot Creator and Bot Runner, the Automation Anywhere Enterprise platform does comprehensive activity logging for bots, workflows, and reports.

Some of the key activities logged include the following:

- Task creation, update, deletion (task is a type of bot).
- Task run
- Workflow creation, update, deletion
- Workflow run
- Report creation, update, deletion
- Report run

- Change in bot properties

## Audit of Bot Runner operations

Bot Insight captures additional Bot Runner events for review and analysis of audit records for indications of inappropriate or unusual activity. The Bot Insight logs can be exported for further analysis. Automated dashboards and reports are available and can be customized to identify and alert on anomalous activity. These capabilities conform to best practices as defined in NIST AU-6 Audit Review Analysis and Reporting.

## Audit log nonrepudiation

The logs are protected against an individual (or process acting on behalf of an individual) falsely denying having done authorized actions through read-only privileges, automated event capture, and binds the identity of the user to the actions, in conformance with best practices as defined in NISGT AU-10 Non-repudiation and AU-11 Association of Identities.

## Export audit logs

All Enterprise Control Room and Bot Insight Bot Runner logs are exported to a Security Event Information Management Systems for further analysis to support the organizations incident response efforts in accordance with the NIST AU-6 and IR-5 requirements.

## Activity logging for bot activity

For every Bot Creator and Bot Runner, Automation Anywhere Enterprise performs a comprehensive activity logging for bots, workflows, reports etc.

Some of the key activities logged are:

- Task Creation, Update, Deletion (task is a type of bot)
- Task Run
- Change in properties

Figure 1. Activities logged sample

The screenshot shows the 'System Logs' window with the 'Task Run' log type selected. The date range is set from 06/01/2017 to 07/07/2017. A table lists 80 task runs, each with a checkbox, showing details like date, time, and description. Below the table, there's an 'Export to CSV file' button pointing to D:\rajendra.vijay\My Documents\Automation Anywhere Files\07-07-2017.csv.

Sr. No.	Task/Variable Name	Date	Time	Description
69	TE_3270_GetText_AllLine.atmx	06/22/2017	15:34:50	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
70	TE_3270_GetText_AllLine.atmx	06/22/2017	15:35:15	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
71	TE_3270_GetText_AllLine.atmx	06/22/2017	15:36:08	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
72	TE_3270_GetText_AllLine.atmx	06/22/2017	15:36:31	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
73	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:39:44	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
74	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:40:06	Task Run, Failed, D:\rajendra.vijay\My Documents\Automation Ai
75	TE_5250_GetText_AllLine.atmx	06/22/2017	15:40:21	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
76	TE_5250_GetText_AllLine.atmx	06/22/2017	15:40:30	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati
77	TE_5250_GetText_AllLine.atmx	06/22/2017	15:41:51	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
78	TE_5250_GetText_AllLine.atmx	06/22/2017	15:42:13	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati
79	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:45:22	Task Run, Started, D:\rajendra.vijay\My Documents\Automation .
80	TE_3270_GetText_LinesFrom-To....	06/22/2017	15:45:31	Task Run, Completed, D:\rajendra.vijay\My Documents\Automati

## Bot version control

The Enterprise Control Room offers a full-fledged version control system for TaskBots, MetaBots, Workflow, files etc. Version control is provided via integration with Visual Subversion (SVN) to provide enterprise strength version management necessary to meet NIST SA-10 Developer Configuration Management requirements.

Version control is essential to change management, to ensure that the developer performs bot configuration management especially when automating complex processes where automation must be coauthored by many automation experts. Version control provides a control point consistent with NIST SA-10 by providing a single point of control to changes to bots to ensure that changes are consistent with integrity and quality consistent with organizationally-defined processes such as Trusted Generation procedures. Version control is enabled in the central Enterprise Control Room via a simple enablement switch and specifying connection details to the SVN server. The SVN server can be provisioned on a separate machine or a clustered environment to eliminate single point of failure.

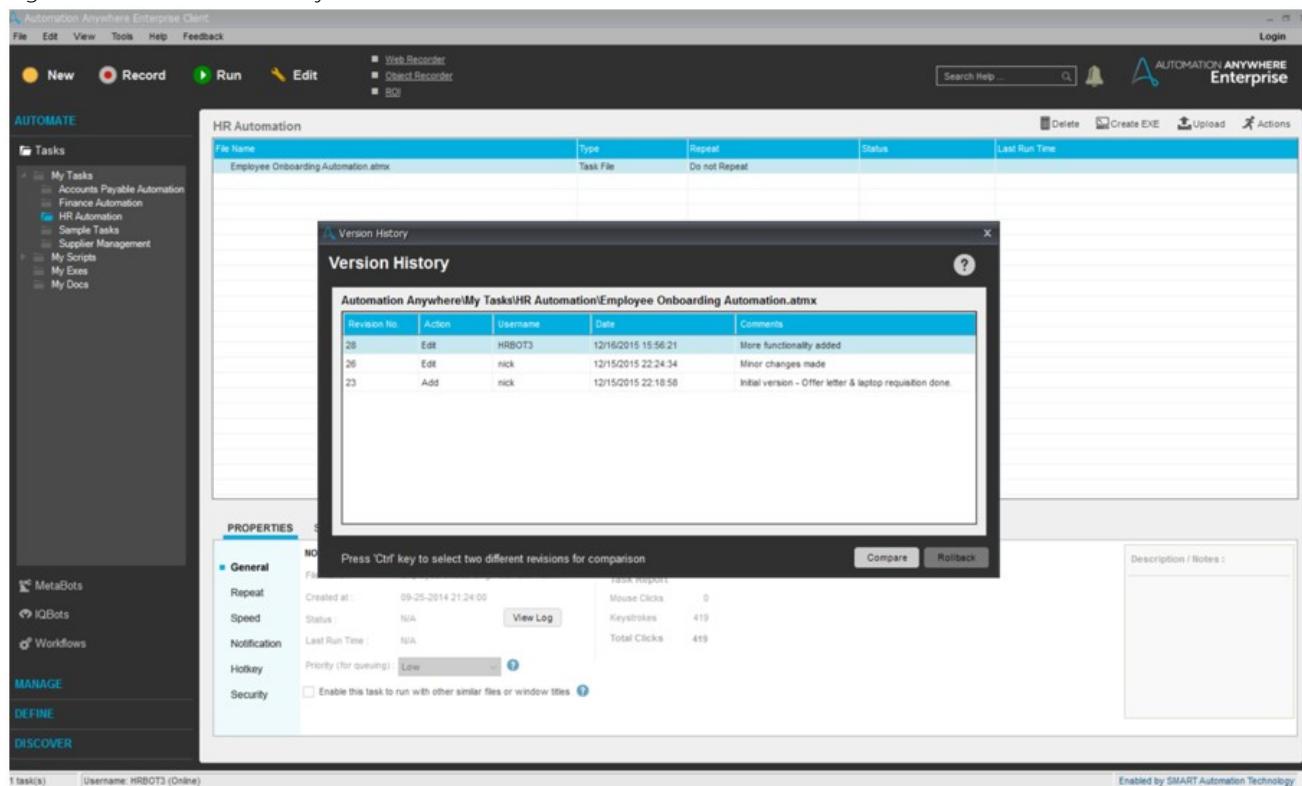
Once version control is enabled, all the rules of version management are enforced by the central Enterprise Control Room:

- Only one user at a time can work on updating a bot (check-out).
- When the user is done modifying a bot, they must 'Check In' the bot, which automatically creates a new version of the bot.

- Users can enter comments when checking a bot in. These comments will be displayed when viewing the version history.
- Users can compare any two versions of a bot to understand the changes and then take appropriate decisions.
- Users can rollback to any of the previous versions of a bot, whenever needed.

It is recommended to backup SVN server regularly using external backup mechanisms. This will ensure archival of all versions of all bots in the central Enterprise Control Room. Enterprises are strongly advised to enable version control in order to maintain traceability of changes to their bots in order to systematize their automation efforts.

Figure 1. Version control system



While the bots are versioned, the credentials used in bots are version agnostic. All versions of the bots use the same set of latest credentials stored in Credential Vault. This ensures that even when user switches to old versions of the bots, latest credentials will be used and bots will not fail.

## Deployment of bots

AAE bots can be marked as "production-ready" for a selected version. Capability to mark "production-ready" version is available through Role Based Access Control (RBAC). Authorized user can select any version of a bot and designate it as production-ready. This allows automation experts to continue to collaborate on upgrading that bot through upload/download via the Enterprise Control Room. This ensures that a work-in-progress bot is not unintentionally deployed on remote Bot Runners.

## Email alert notifications

Events captured and logged can also be configured as alerts. Email notification can be setup to have users notified when an event is detected.

This feature can be setup for multiple users or process stakeholders. E-mail alerts can help address incident response and handling (NIST IR 4, 6). The Auto Login feature in Control Room is now enhanced to send email notification in case Windows Auto Login fails on the client machine. This helps stream appropriate TaskBot failure information to the Control Room user who has deployed and run the TaskBot.

## Additional security controls

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

### Restrict installation from database system administrator account

All the database level transactions are done with a nonsystem administrator account. The Enterprise Control Room installer passes the SQL Server 2012 certification test.

### Autolock the device

When Automation Anywhere Enterprise bots are deployed from the Enterprise Control Room to remote Bot Runners, they revert the Bot Runner system to its original state. For example, if the Bot Runner machine was logged off and our bot logged into the machine, it logs it off after the automation execution finishes. This ensures that system level security is not compromised.

### Using SHgetKnownFolderPath function

Automation Anywhere software uses the SHGetKnownFolderPath function and Knownfolder\_ID to determine the full path to the special folders. This is a recommended practice from Microsoft and use of this function ensures that system will never redirect automation data to any other folder, even if someone attempts to hack the function call. This is also one of the InfoSec requirements of Automation Anywhere Enterprise customers.

### API level security

Automation Anywhere software does authentication and authorization level checks at the API level. API calls are serviced only for those users who have permission on the automation data. Unauthorized users cannot bypass system security through rogue API calls.

### Clean uninstall

When Automation Anywhere Enterprise client software is uninstalled, it leaves no trailing files or folders behind. This clean uninstall of the Enterprise client software complies with InfoSec policies.

## Store data in Program Data folder

Automation Anywhere 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 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 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

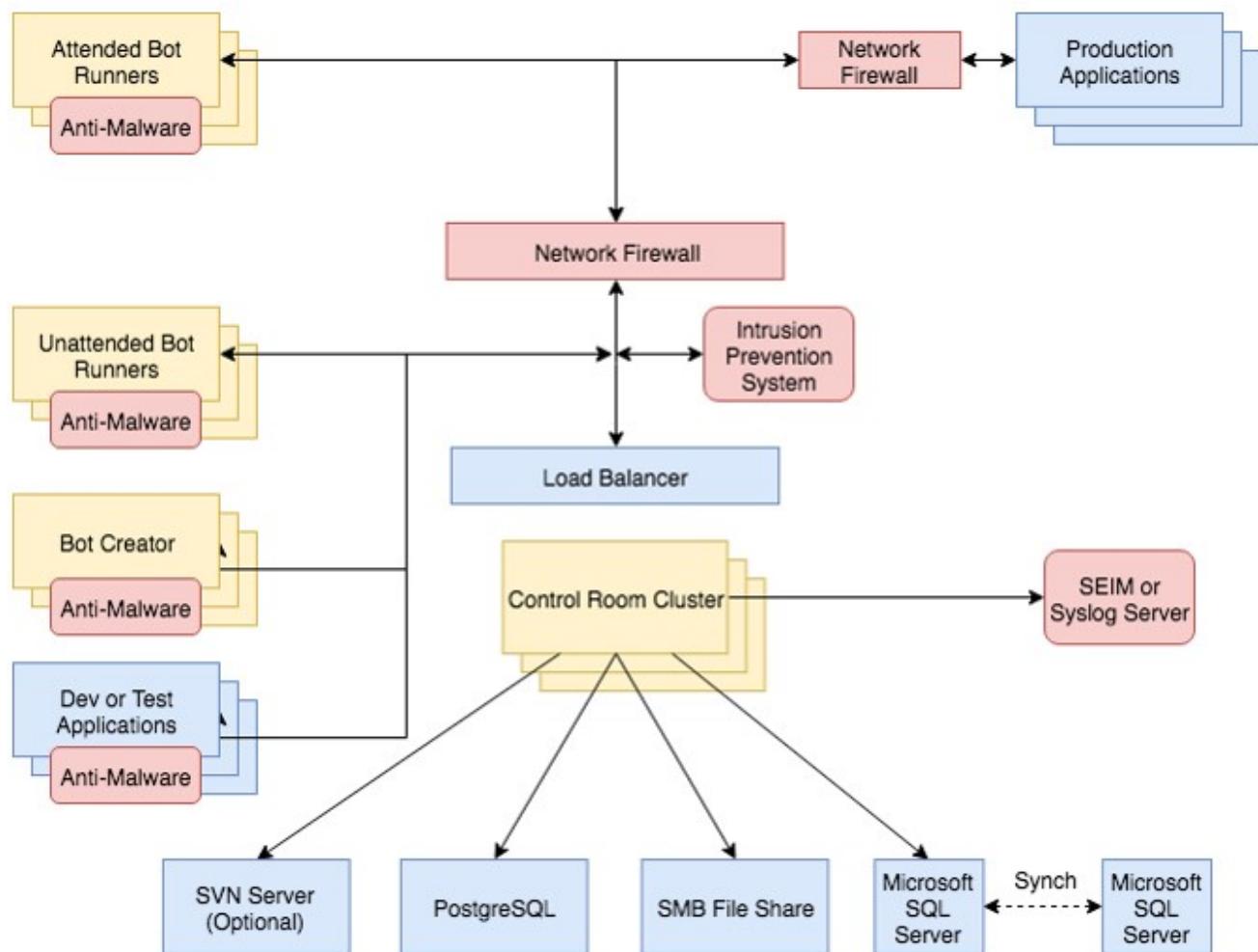
Users can securely use German, French, Italian, and Spanish language keyboard characters through the embedded automation commands in Bot Creators. This enables users to write data into these languages. Automation Anywhere customers do not need to depend on less secure third-party libraries for this automation.

# Securing the RPA environment with external controls

The Automation Anywhere architecture consists of a standard desktop and server class infrastructure for the clients and the Enterprise Control Room.

## RPA platform

This topic details the best practices for securing the RPA platform with external security controls. Network-based firewalls, Intrusion Detection Systems, anti-malware, and external log servers are all standard security controls that are relevant to RPA deployment and the other infrastructure in your environment. The following figure shows logically where these components are deployed in the RPA deployment:



Each external security control is discussed in detail in the following sections, in terms of placement and configuration. Supporting network services such as Active Directory, SVN Server, PostgreSQL Server, SMB File Share, Microsoft SQL Server, and Production applications, and are accessed through network firewalls or directly, depending on their placement relative to the RPA components.

## Network-based access control to protect RPA with firewalls

Network-based firewalls and local server-based firewall are used to protect the Enterprise Control Room or all nodes in a Enterprise Control Room cluster. By default, required protocols on the Enterprise Control Room are permitted from the corporate network. Additionally, all clustering protocols are permitted only between the nodes in the Enterprise Control Room cluster. Network-based firewalls are used to isolate Development, Test, and Production RPA environments from the corporate network and from each other.

For unattended automation environments, the Bot Runners are placed in a specific isolated network and protected by a network-based firewall. Attended automations run from corporate workstations with the Bot Runner client 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 Enterprise client runs on desktop class infrastructure and is considered a corporate desktop. Anti-malware or anti-virus software is used to protect the client 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.

## Security Event Incident Management to protect RPA with external auditing

All Automation Anywhere Enterprise Control Room logs can be forwarded to a Security Event Incident Management (SEIM) system for external storage, processing, and alerting. Integration with SEIM or any Syslog-based audit consolidation and reduction system greatly enhances the security posture and governance compliance. Configure the Enterprise Control Room to forward audit logs to the appropriate Syslog collection server in the environment.

## List of cryptographic providers

### Client

- AES256 – Microsoft .NET AesCryptoServiceProvider
- RSA2048 – Microsoft .NET RSACryptoServiceProvider
- HMACSHA256 – Microsoft .NET HMACSHA256
- PGP Encrypt/Decrypt command – Bouncy Castle OpenPGP 1.8.1

### Control Room

- AES256 – Bouncy Castle FIPS 1.0.0 or later
- RSA2048 – Bouncy Castle FIPS 1.0.0 or later
- HMACSHA256 – Bouncy Castle FIPS 1.0.0 or later

- PBKDF2 + HMACSHA512 -- Bouncy Castle FIPS 1.0.0 or later